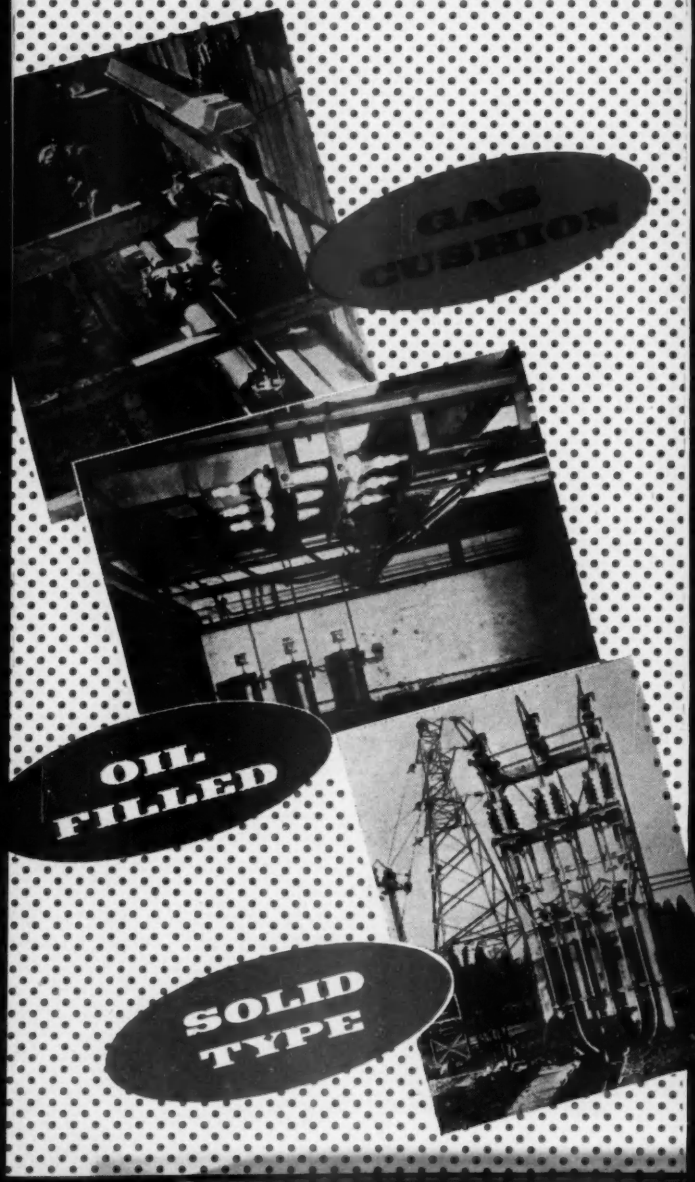
ELECTRICAL TIMES

THURSDAY
9 AUG.
1951
NINEPENCE



HENLEY

Specialists in Super-Tension Cable Technique

We are able to install complete super-tension schemes, including joints, terminations, etc., for all three of the principal underground cable systems: Gas Cushion, Oil Filled and Solid Type.

Illustrations show typical super-tension contracts carried out by HENLEY'S.

BY APPOINTMENT
ELECTRIC CABLE
MANUFACTURERS

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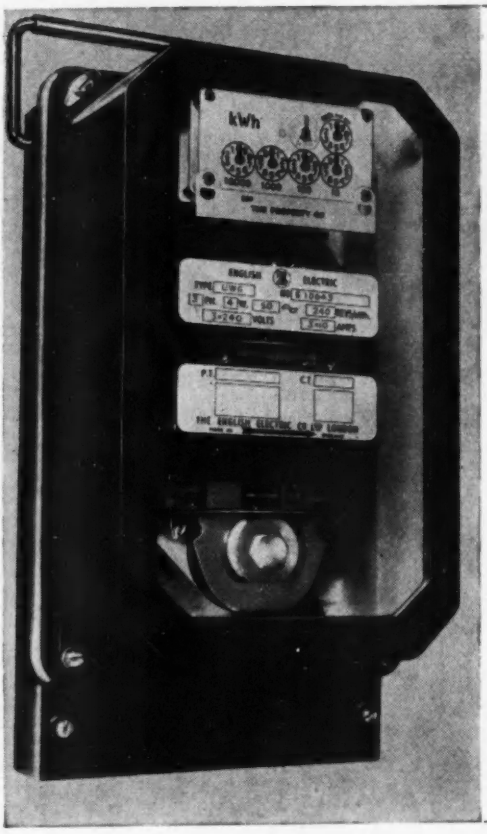
TELEGRAPH WORKS CO. LTD.
51-53 HATTON GARDEN, LONDON, E.C.1

Ship building
VIKING
Berry's
ON
OFF
50AMP TP
SWITCHGEAR OF TODAY
Berry's
ELECTRIC LTD
TOUCHBUTTON HOUSE
NEWMAN ST., LONDON W.1.

'ENGLISH ELECTRIC'

polyphase meters



Permanency of calibration ensured
with single piece laminations

Maximum bearing life
with ball type jewelled bearing

Fully temperature compensated

The ENGLISH ELECTRIC Company Limited
QUEENS HOUSE, KINGSWAY, LONDON, W.C.2
Instrument Works, Stafford

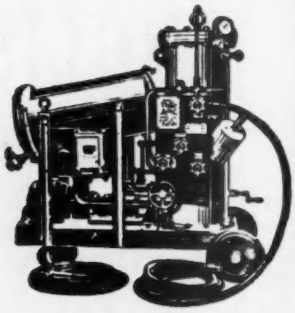
Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

M.1

A

Cold Filtration of Insulating Oils

The insulating value of used transformer and switch oils by one passage through the Metafilter is raised to a higher break-down voltage than the new oil.
The plant is purely mechanical and extremely simple in operation.



Capacities from 20 gallons to 1,000 gallons per hour.

METAFILTRATION

PHONE HOUNSLOW 1121-2-3
GRAMS METAFLTR HOUNSLOW

THE METAFILTRATION COMPANY LIMITED, BELGRAVE ROAD, HOUNSLOW, MIDDLESEX

Switches of Character
AND FAULTLESS PERFORMANCE

No. 101
'Architrave'
Type

NEW DAY
ELECTRICAL ACCESSORIES LTD.
136-8 Mary St., Birmingham 12. Tel.: Calthorpe 2621

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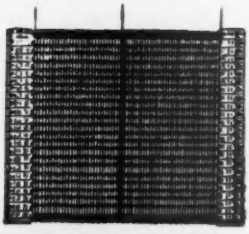
WIRE RESISTANCE NETS

Speedily supplied from stock, or 'made to measure' at a cost that will please you. Our Technical Service will help you with any problems.



CRESSALL
Registered Trade Name of—
The CRESSALL MANUFACTURING CO., LTD.
Tower Street, Birmingham 19
Telephone: ASTon Cross 2666 (3 lines.)
Telegrams: OMHIC, BIRMINGHAM

● SWITCHGEAR CATALOGUE 11th EDITION
ILLUSTRATES A COMPLETE RANGE OF
L.T. SWITCHES. SWITCHFUSES.
DISTRIBUTION BOARDS.
INDUSTRIAL PANELS AND SWITCH-PLUGS.

WRITE FOR YOUR COPY.

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LONDON A.W.ZELLEY & R.PAYNE. | BIRMINGHAM. C. BAKER. | N.MIDLANDS. G.H.GARBETT. | S.MIDLANDS. C.G.BACHELOR. | N.WEST. H.N.POLLARD. | SOUTH W.L.WHITE. | SCOTLAND J.G.HARRIS

Other people's jobs

Men like George Hoare, one of our pattern makers, do a job with a skill that we (and probably you!) could not acquire in a thousand years. Here George Hoare is putting the final touches to the plate pattern of the standard Grill-boiler fitted to all Belling cookers. George and his colleagues in the pattern shop are highly skilled craftsmen working to precision limits as pattern making must be free from the slightest error.

You can't beat a "Belling"

BELLING & CO. LTD., BRIDGE WORKS, ENFIELD, MIDDX. HOWARD 1212
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1881....Axminster Carpets
... 4'11

That was the price of an Axminster in 1881, but if you wanted an Indian rug you had to pay as much as 7s. 11d.

It was in that year, too, that the Company of Falks was established, with a staff of four. Today, the Company which now employs over 3,000 is one of the leading manufacturers of industrial and domestic electrical equipment.

FALKS ...70 years service

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Branches and Agencies throughout the World

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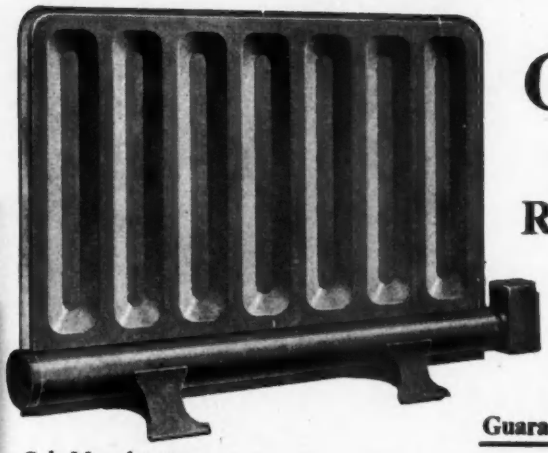
Central Heating Automatically Controlled with



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All Electric

RADIATORS

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Write for Trade Terms and Brochures

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Guaranteed for Twelve Months

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Registered design No. 862,944

BRYCE

now manufacture

TRANSFORMERS

up to **10,000 kVA**

INDUSTRIAL CAPACITORS for Power Factor Correction are made for voltages up to 33kV.

BRYCE ELECTRIC CONSTRUCTION COMPANY LTD.

HACKBRIDGE • WALLINGTON • SURREY

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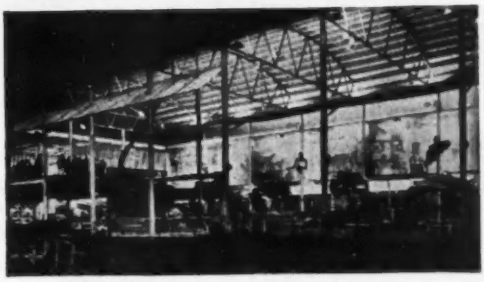
ASSOCIATED WITH

HACKBRIDGE CABLE COMPANY LTD.

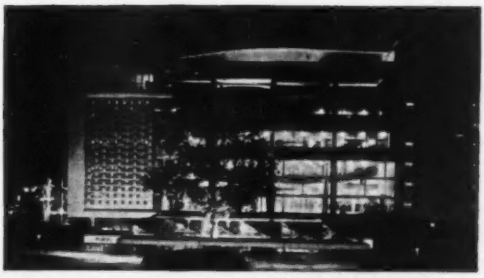
Simplex

at the Festival— here there & everywhere

The Pleasure Gardens... the biggest rides in the world —and some bright lighting. Those two chequered pylons, for instance: they're lit with Simplex Fiesta-floods



The Dutch Barn of the Country Pavilion, the roof a canopy of light. The lights? Simplex LS. 71 standard Reflecto-floods, inverted on Simplex wall mounting brackets



A new home for the world's music—The Royal Festival Hall. The canopy at the front entrance—the poster on the left of the picture—are lit by Simplex Fiesta-floods

Can we help you with some bright lights?

MADE BY THE HOUSE OF Simplex

Simplex Electric Company Limited Oldbury Birmingham and Branches A TI COMPANY

What a way to employ a skilled toolmaker!

No one in their right senses uses skilled craftsmen to do the sweeping up and tea making and sich. Your toolmakers should use their skill and time on the job that nobody else can do—making *your* special press tools. Press Tool *Sets?* That's a skilled job too, but the plain, blunt truth is that we can make them for you just as well and at less cost than your toolmaker.

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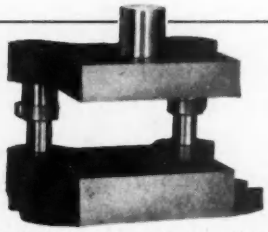
PRESS TOOL SETS



DESOUTTER BROS. LTD., THE HYDE, HENDON, LONDON, N.W.9. Tel: Colindale 6346 (5 Lines) Grams: Despruco, Hyde, London. CRC 75

PROOF OF SUCCESSFUL PIONEERING

the first

132 k.v GAS FILLED CABLE LAID IN GT. BRITAIN DEC·1937

has given and is still giving "most satisfactory service"....

THE FOLLOWING ARE EXTRACTS FROM A REPORT BY THE BRITISH ELECTRICITY AUTHORITY ON THE PERFORMANCE OF THIS CABLE

132 kV GLOVER GAS-FILLED CABLE INSTALLATION AT WIMBLEDON

(a) The cable was laid in the form of a loop, 1 mile in length; and was connected in series through isolators.

(b) No maintenance was carried out other than the cleaning of sealing end porcelains.

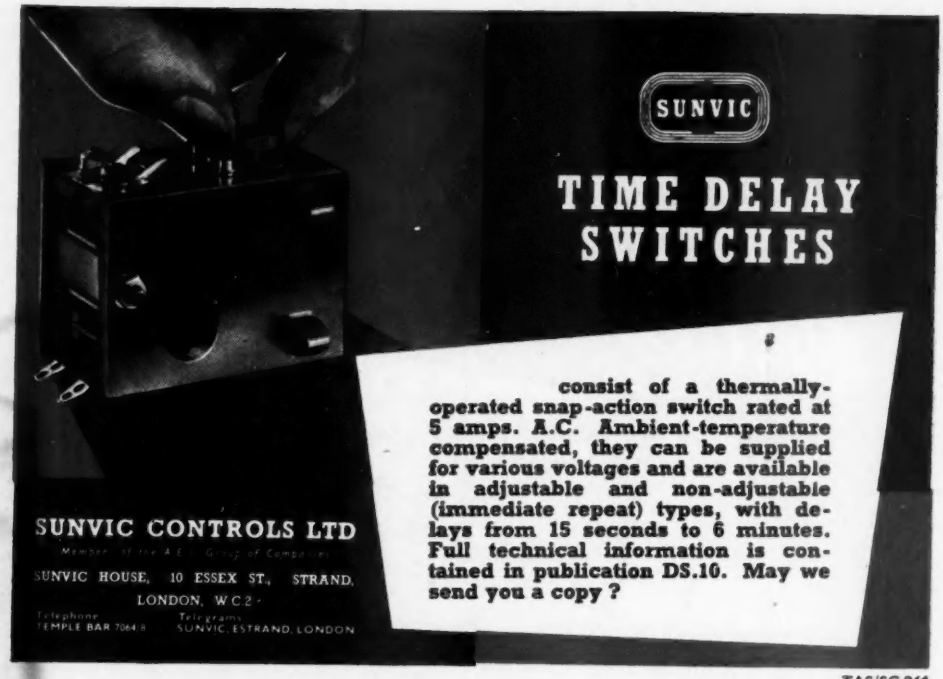
(c) No technical faults occurred on the cable.

(d) The performance of the cable was most satisfactory.

W. T. GLOVER & CO LTD.

TRAFFORD PARK MANCHESTER 17

TRAFFORD PARK 2141


SUNVIC
TIME DELAY SWITCHES
consist of a thermally-operated snap-action switch rated at 5 amps. A.C. Ambient-temperature compensated, they can be supplied for various voltages and are available in adjustable and non-adjustable (immediate repeat) types, with delays from 15 seconds to 6 minutes. Full technical information is contained in publication DS.10. May we send you a copy ?
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Telephone TEMPLE BAR 7064/8
Telegrams SUNVIC, ESTRAND, LONDON

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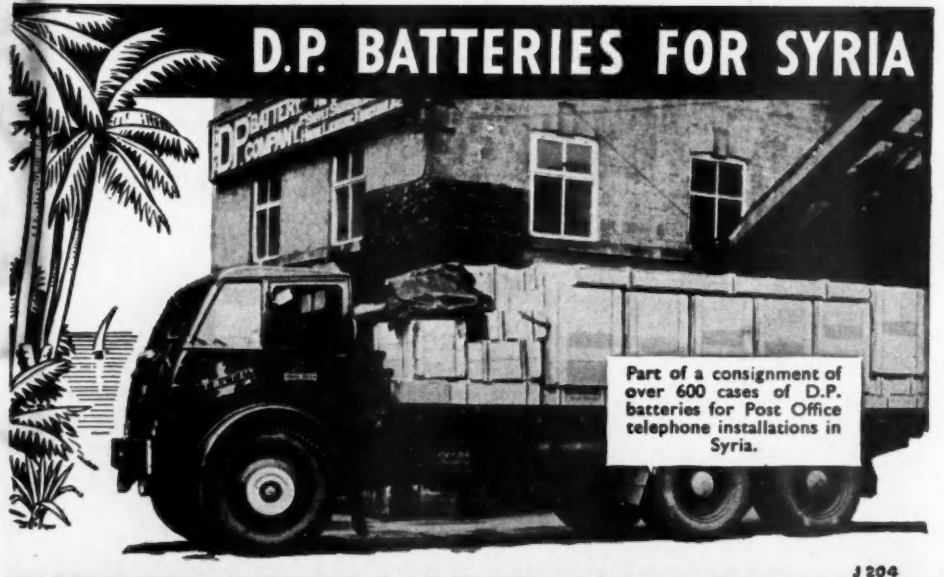
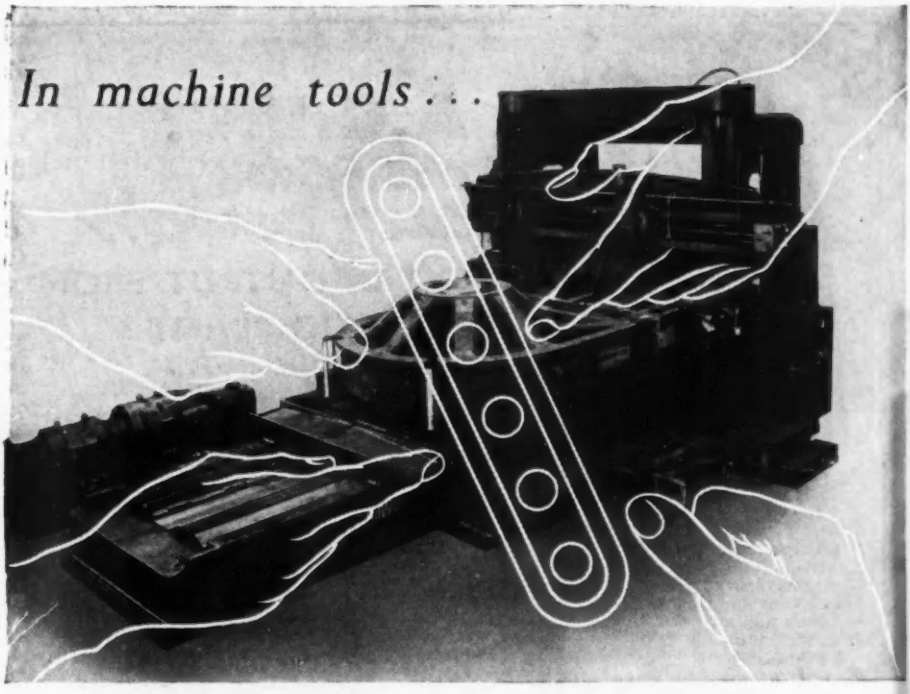

D.P. BATTERIES FOR SYRIA
Part of a consignment of over 600 cases of D.P. batteries for Post Office telephone installations in Syria.

J 204

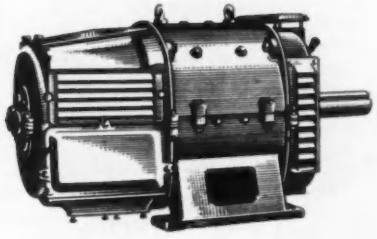
The D.P. BATTERY Co. LTD., BAKEWELL, DERBYSHIRE
LONDON
50 GROSVENOR GARDENS S.W.1



Push Buttons for Productivity

Even in the up-to-date production shop there is room for reducing time-wasting manual labour by thoughtfully applied electrical drives. In the M-V Motor Department are engineers who really understand the electrical problems of the machine-tool industry and their advice is available at the drawing board stage for new machines or on the conversion of existing equipment.

A typical Metrovick Type "Q" Direct Current Motor.



METROPOLITAN-VICKERS ELECTRICAL CO. LTD., TRAFFORD PARK, MANCHESTER, 17
Member of the A.E.I. group of companies

METROVICK *Motors for all Industrial Drives*

J/A002

A.C.E.C.

INCREASE LOAD CAPACITY

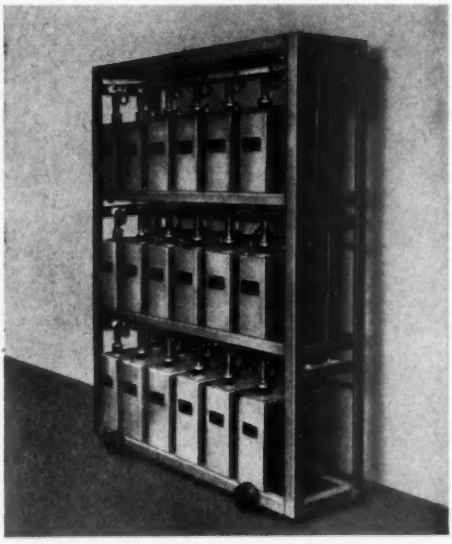
EXTRA OUTPUT FROM EXISTING PLANT

POWER FACTOR IMPROVEMENT CAN GIVE IT — *FOR NOTHING*

It is well known that Static Capacitors provide a satisfactory means of reducing "idle" wattless current in any given installation. In present conditions their adoption will serve purposes more useful than ever before and may solve your particular problem in obtaining additional "real" power from your present installation without having to provide additional supply cables or new transformers.

Any outlay on capacitors in this direction is quickly recouped —often within the space of two years — hence INCREASED LOAD CAPACITY FOR NOTHING; but you should take advantage of improvements in modern technique and install A.C.E.C. capacitors (known as ACECLOR).

The impregnating and filling medium is pure Diphenyl Pentachloride refined and processed by our specialists. ACECLOR capacitors outmode any other type in virtue of their new characteristics:—



★ **NON - INFLAMMABILITY**
★ **LOWER COST PER kVAR**
★ **HIGHER FACTOR OF SAFETY**

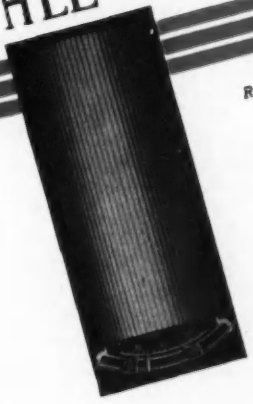
Further details of these modern capacitors are given in our leaflet 230.1 obtainable on request

A.C.E.C. CHARLEROI

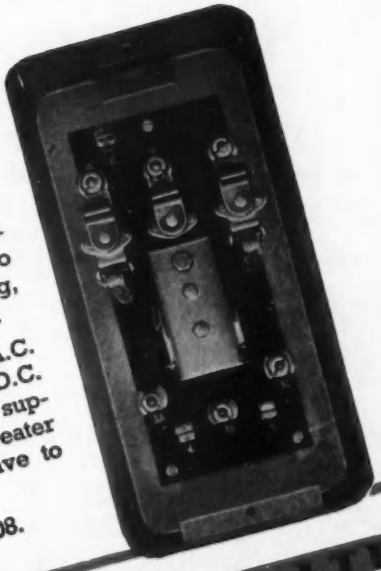
ATELIERS DE CONSTRUCTIONS ELECTRIQUES DE CHARLEROI (Belgium)
56, VICTORIA STREET, LONDON, S.W.1. *Telephone VICtoria 3662*

"Satchwell"

FOR ALL CONTROL SCHEMES



Room thermostat type "Q" capacity 15 amps A.C.



Interior view, Triple-pole Contactor type R.A.3 rated 30 amps per pole.

The "SATCHWELL" room thermostat type "Q" is particularly suited to the control of electric Space Heating, to provide comfort and economy.

Single, double and triple-pole A.C. Contactors type "RA" and D.C. Contactors type "RD" can be supplied for use where loads greater than the thermostat rating have to be switched.

Send for lists 100 and 108.

THE RHEOSTATIC CO LTD
SLOUGH
ENGLAND

or in a flash!

CUT YOUR COSTS AND RAISE CAPACITY

Faster output, reliability, economy of labour, a saving of material, and other advantages, by using

CYC-ARC STUD WELDING!

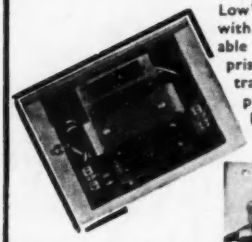
Visit us at Stand 9V, Empire Hall, the Engineering, Marine & Welding Exhibition, Olympia, London, W.1., or write to:

CYC-ARC LTD.

27-29 NEW NORTH ROAD, LONDON, N.1.

Cyc-Arc Stud Welding on large water-wheel. Photograph by courtesy of Messrs. Metropolitan-Vickers Co. Ltd., Manchester.

LOW VOLTAGE TRANSFORMERS



Low Voltage Lighting Unit with lid removed. Suitable for M/c tools, comprising double-wound transformer with fused primary and secondary D.P. on-off switch, housed in steel case.

Low Voltage Portable Transformer suitable for hand-lamps, portable m/c tools, etc. Fitted with Reyrolle plugs and sockets and carrying handle.

We specialise in the manufacture of LOW VOLTAGE TRANSFORMERS to customers' individual requirements. Single or three-phase from 50 V.A. to 25 k.V.A.

JOHN DRUMMOND (ENGRS.) LTD.

23 Lochburn Road, Maryhill, Glasgow N.W.

Tel: Maryhill 1893

"Dunlow"

ELECTRIC IMMERSION HEATERS

"Grid" type for fitting through side. 1 to 4 kw.

Fitted with Safety Switch

for

WATER BOILERS, STERILIZERS AND OPEN TOP VESSELS

Many other types. Cat. 107 Sec. 2

DUNCAN LOW LTD.

290 Bell Street, Glasgow, C.4

Telephone: Bell 1961-2 'Grams: "Immerser, Glasgow"

Talking about
MAINTENANCE

The Jackson Cooker is such a first class engineering job that it demands absolutely minimum attention where maintenance is concerned. In several areas there are many " 20 Series " Models — made in 1922 — still on circuit. — Think of it, 27 years of daily service! In 1939, of all cookers sold, over 40% were Jackson. To-day, as always, the Jackson ' Cleanline ' series still serves the engineer faithfully. The solid cast iron and heavy gauge steel construction — the design of the oven and elements which permits an amazing food capacity for an oven of its size — the quality of the vitreous enamel, which is second to none — all combine to make a Jackson the obvious choice for Hire and Hire Purchase Schemes. Low in maintenance cost — low in fuel consumption and thoroughly perfect in cooking. Ask any Maintenance Engineer who has thousands to look after and you will learn why Jackson have made and ***sold over half a million cookers.*** *Supplied in three attractive colours, mottled grey, mottled green and two tone ivory. The ' Cleanline ' series complies with E.D.A. interchangeability and specifications.*

THE JACKSON ELECTRIC STOVE CO., LTD.
143 Sloane Street, London, S.W.1. SLOane 6248

high quality
rectifier
equipment
for industry

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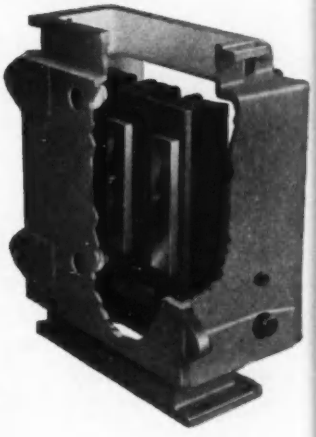
Registered Office : Connaught House, Aldwych, London, WC2

RECTIFIER DIVISION: Warwick Road, Boreham Wood, Herts.
Telephone: Elstree 2401 Telegrams: Sentercel Borehamwood

'ENGLISH ELECTRIC'
fusegear

Fully-Shrouded Contacts now STANDARD on C.F.S.

At the 1949 B.I.F. a new range of Combination Fuse-Switches was introduced. These, the 'English Electric' type CH, featured fully-shrouded contacts permitting high breaking-capacity in manual operation.



Widely appreciated by users, this feature has created such a demand that manufacture of the non-shrouded pattern has ceased. All orders for Combination Fuse-Switches are being met with the fully-shrouded units.

Full-shrouding between phases and from phase to earth is illustrated. The shrouding increases operator-safety and eliminates risk of flashover should any hand tool or other metal object fall into the Fuse-Switch unit.

The ENGLISH ELECTRIC Company Limited

QUEENS HOUSE, KINGSWAY, LONDON, W.C.2

Fusegear Works: East Lancashire Road, Liverpool, 10

Works: STAFFORD · PRESTON · RUGBY · BRADFORD · LIVERPOOL

F.4

THREE AMAZING OFFERS

at a greatly reduced price

A special reclaimed wool felt for industrial purposes, can be made with a high percentage of wool in blocks and sheets of any quantity. Ideal for oil filters, etc. Send your specification and we will help fill your needs.

Special bags in cotton waste and rubber, ideal for packing instruments, etc. Made in all sizes and thicknesses, tough—over 100 lbs. per square in. bursting strength—durable, and can be water-proofed. This material makes indestructible labels suitable for any type of printing, ideal for export.

at a THIRD of normal cost

Ideal for the factory maintenance engineer • In strips and lengths • An improvisor dust extractors and air filters, etc • No thin patches • Does not become slimy • Soft and pliable when wet • Strong and durable • Does not become stiff when dry • Lasts longer and improves with use.

Machine covers specially prepared in all colours.

We specialize in export orders.

Send us your problems and we will do our best to manufacture your requirements.

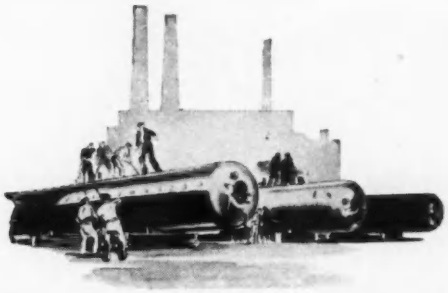
New All-British Products

Walter Shaw Ltd.

Sales Division:
93 Great Portland Street, W.1
Telephone: Langham 3744

Works:
70-74 Bickerstaffe Street
St. Helens, Lancs.

Telegrams: Magispon, Wesdo, London



BABCOCK

Steam Raising Plant

The capacity of Babcock boilers installed and on order has reached a total of approximately

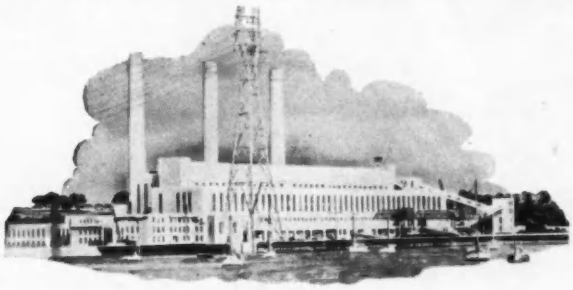
3,600,000,000

lb. of steam per hour

This colossal total is an indication of the outstanding importance of Babcock steam raising plant to the world's economy, in the fields both of power generation and industry, for it serves both in equal measure.

Babcock steam raising plant does literally serve the world, is the product of a worldwide organisation, is backed by a worldwide service. It embraces everything required for reliable, economical production of steam, on a large or small scale and up to the highest temperatures and pressures.

CLIFF QUAY power station, one of the many B.E.A. stations equipped with BABCOCK steam raising plant, has nine P.F. fired High Head boilers each to evaporate 365,000 lb./hr. at 635 lb/sq. in., 850°F.



BABCOCK & WILCOX LTD.

BABCOCK HOUSE, FARRINGDON ST., LONDON E.C.4.

A WORLDWIDE ORGANISATION

Brook

AUTOMATIC STAR DELTA SWITCHING STARTER

A compact automatic Starter. For use where starting currents need to be limited to 150/200% full load current with 33/60% torque.

BROOK MOTORS

HUDDERSFIELD • ENGLAND

Makers of A.C. Electric Motors from 0·25 to 200 h.p.

CHINA CONNECTORS

1, 2 and 3 WAY

5-15 AMP

PROMPT DELIVERY *at the moment.*

For full details of *all* Metway Wiring Accessories; please send 6d. for a copy of our new

92 page **LIST No. OH/31/E.T.**

METWAY ELECTRICAL INDUSTRIES LTD.

KING STREET, BRIGHTON, 1.

Tel: Brighton 28366. Grams: Metway, Phone, Brighton

Now visitors see Evesham's beauty by Day and by Night . . . . .
The soft golden light from Revo sodium lighting fittings, unobtrusively situated on wall brackets, still further enhances the charm of this picturesque old-world town.
REVO
REG.
STREET LIGHTING EQUIPMENT

REVO ELECTRIC COMPANY LIMITED, TIPTON, STAFFS

Non-corrodible die-cast top member
Rubberised asbestos washer
All-porcelain body, incorporating lampholder in one piece
Fixing screws, 2 in. centres
Heavy gasket providing positive watertight joint
Screw neck pressed glass globe
STANDARD DISPERSIVE REFLECTOR MODEL
STANDARD ANGLE-CONCENTRATING REFLECTOR MODEL
STANDARD DISTRIBUTIVE REFLECTOR MODEL

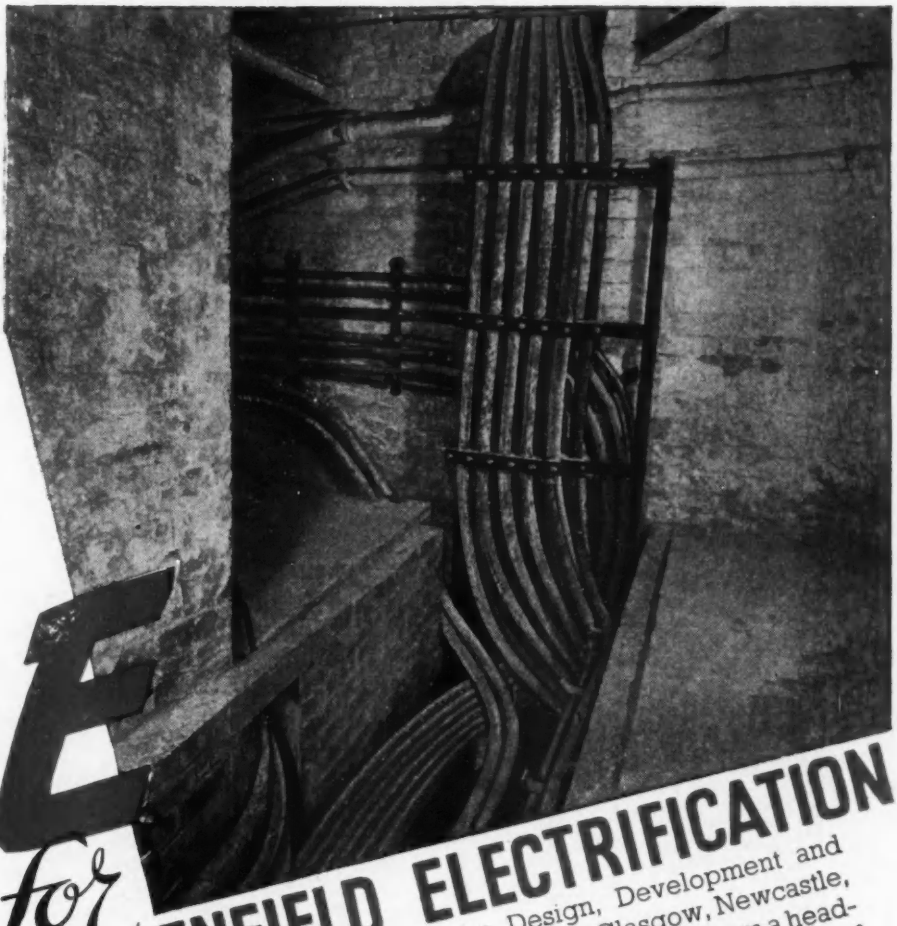
R·E·A·L

Non Corrodible Watertight Fittings

Send for Leaflet of Complete Range

60 WATT FITTINGS
100 WATT FITTINGS
200 WATT FITTINGS

Issued by ROWLANDS ELECTRICAL ACCESSORIES LTD., R·E·A·L WORKS, BIRMINGHAM, 18



E for ENFIELD ELECTRIFICATION

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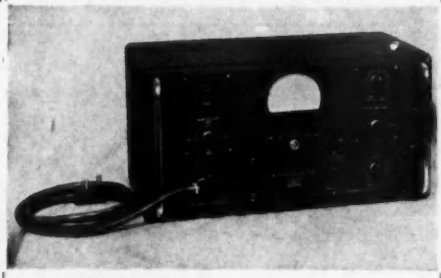

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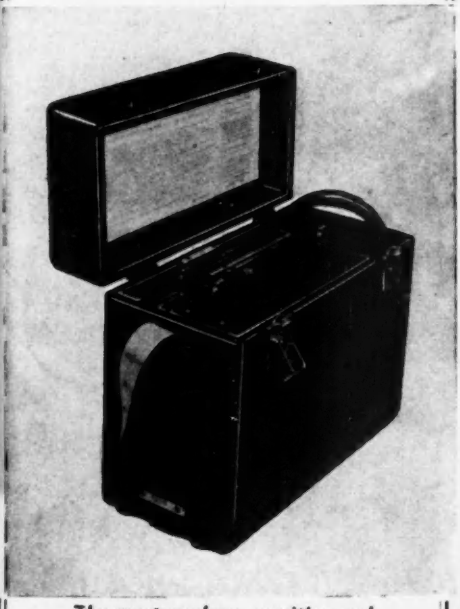

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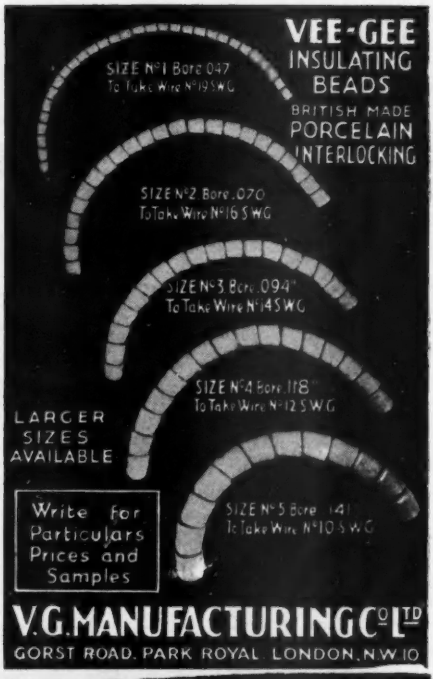

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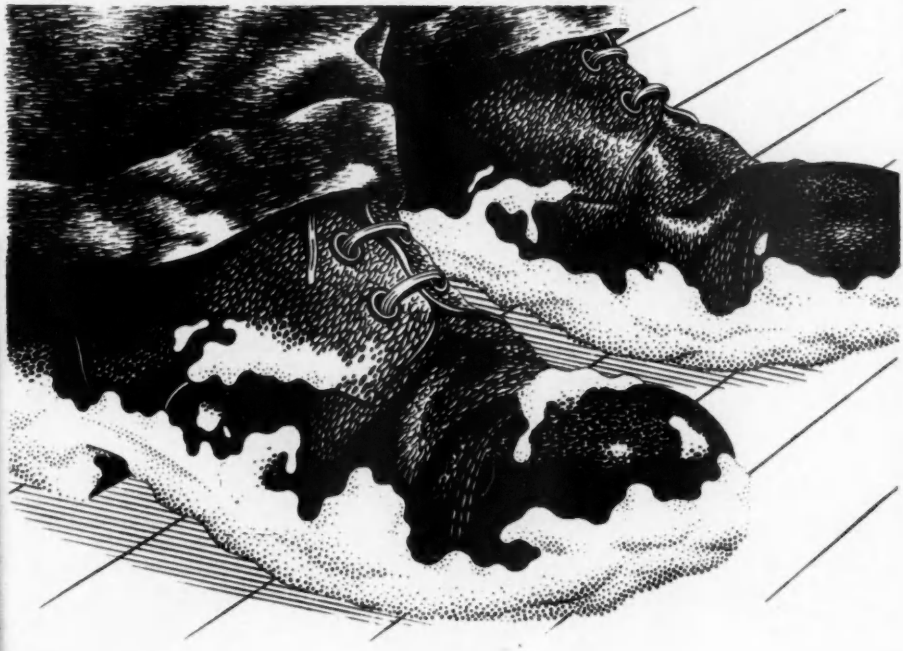

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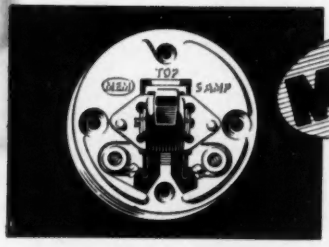

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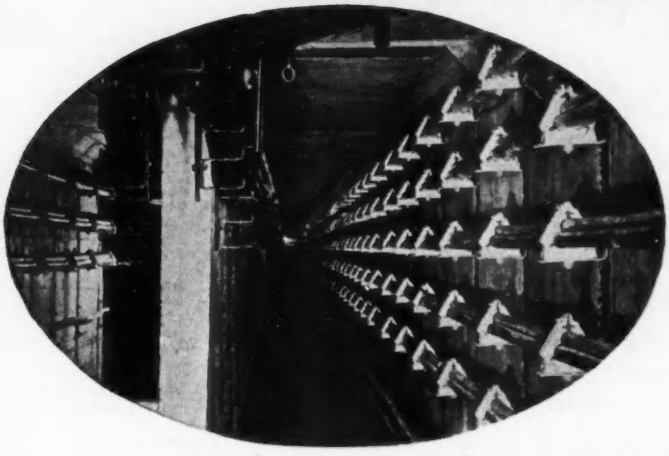

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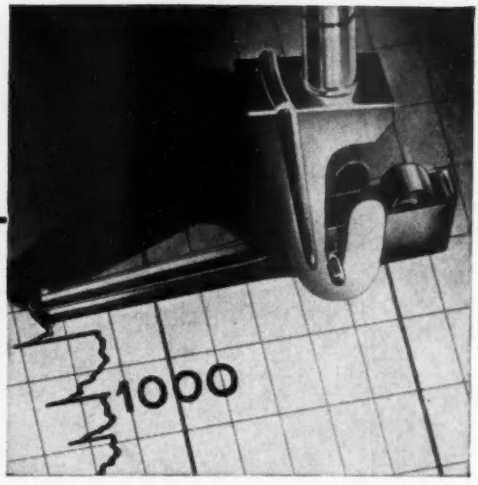

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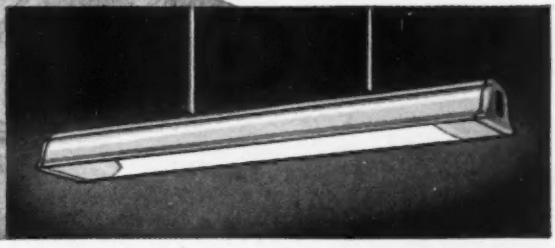

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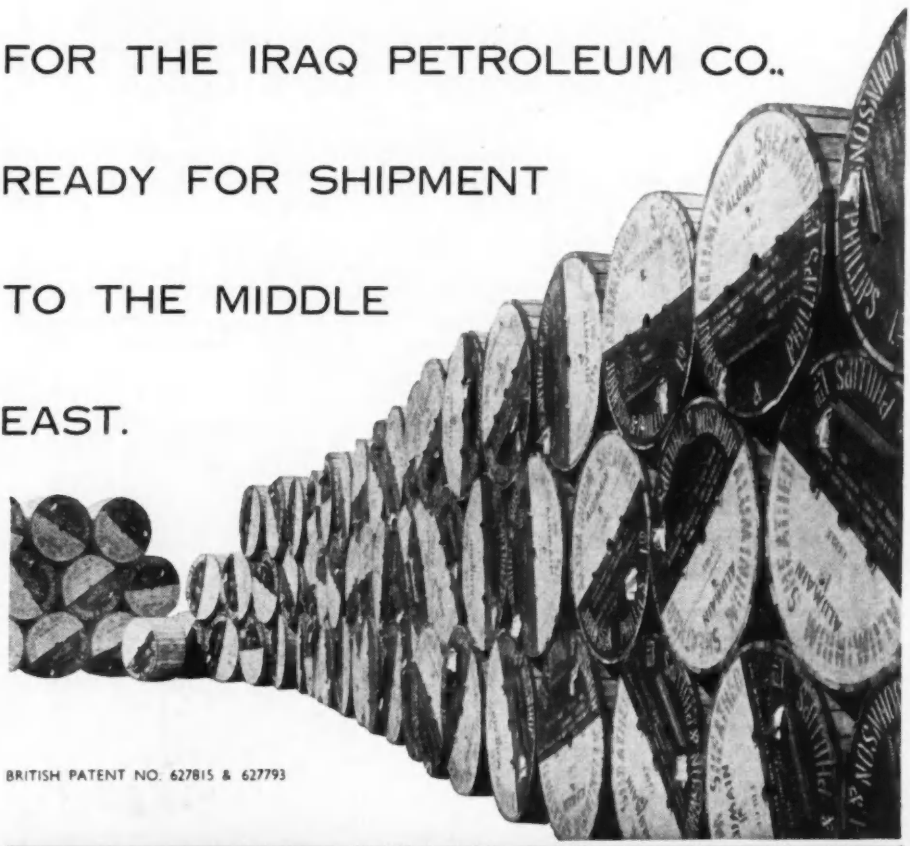

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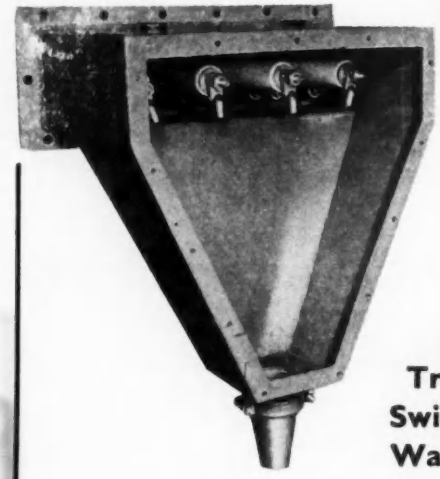

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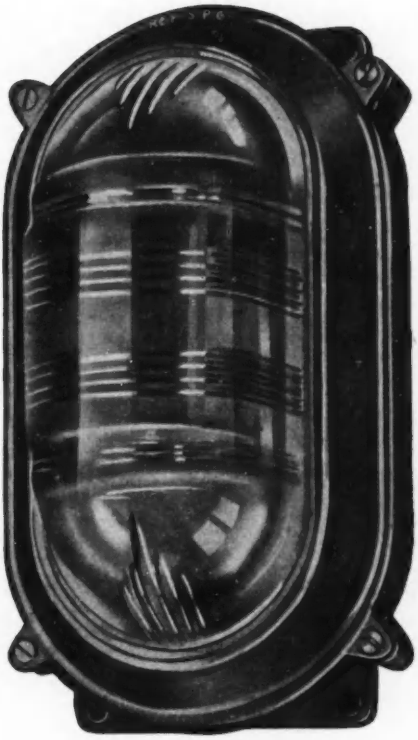

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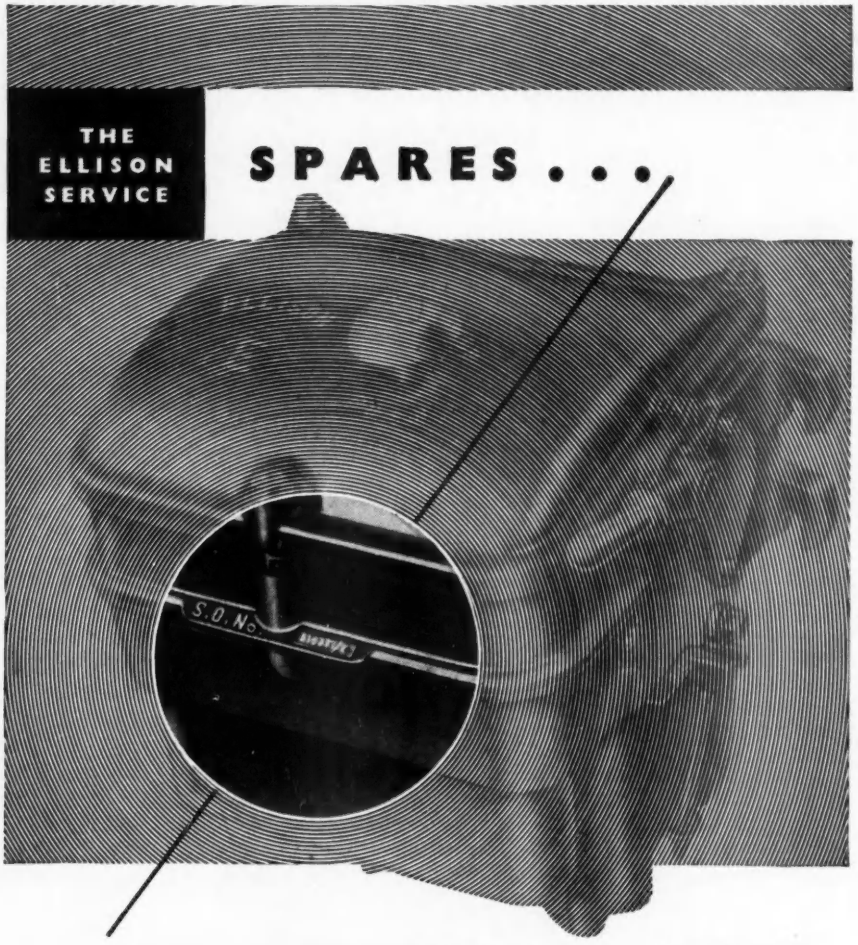

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Vol. 120 No. 3118 THURSDAY, 9 AUGUST, 1951

PUBLISHED EVERY THURSDAY

SIXTIETH YEAR OF PUBLICATION

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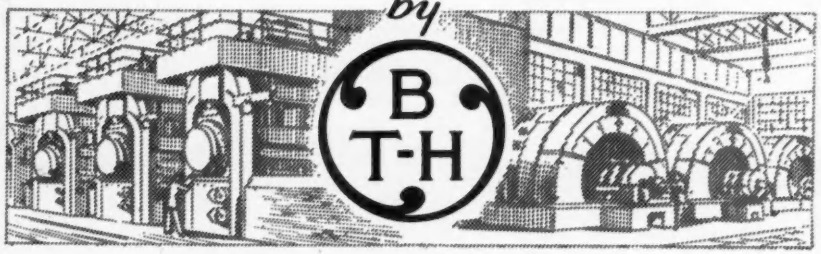

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Editorial

SPEEDING THE ATOM

IN 1945 popular imagination visualised atomic power stations as just round the corner, with very low unit costs a likely result. *Meteor* sounded a warning note on both points in those days, but he was hardly prepared for the continuous pushing forward of the "likely date" for the practical realisation of nuclear generation of power. The latest estimate of the delay before Britain is operating atomic power stations is "a generation"; which seems a long period when it is added to the six or seven years' work already carried out. Metallurgy and economics are the two limiting sciences, and the top scientific committee which made this estimate recognises that a more favourable economic climate may speed progress overseas. Support for this view comes in an address given in Australia last month by PROFESSOR OLIPHANT, the well-known investigator in this field: Australia's chronic fuel shortage and the present cost of electricity generation convinces him that nuclear-energy based electric power would be a better proposition there than in England or America. If this proves so it will give valuable and welcome experience to Commonwealth engineers in a shorter time than they would have to wait in this country.

TECHNOLOGISTS SAVE TIME

TIME lag between the discovery of the scientific information making nuclear fuel for power generation feasible, and the practical realisation of such possibilities, is an example of the need for greater attention to the development stage of invention which was underlined by H.R.H. The Duke of Edinburgh in his Presidential address to the British Association this week. At the root of the problem of speeding industrial application of scientific research he put the present congested system of technological education in this country. Any improvements in this field will result eventually in greater productivity and higher quality. The need for quick action is emphasised in the Government's Scientific Advisory Committee report, which states categorically that the rearmament programme has thrown out of balance the plans of universities and technical colleges to satisfy the short-term demands of industry for scientists and technologists. Whatever the form administration and degree-giving may take—and there is considerable division of opinion here—the need for more teachers and more or bigger colleges to supply more and better-trained applied scientists remains of most immediate importance to the economy of the country in general. This is no new theme to these notes, nor elsewhere, and determined action is demanded even in this time of stringency in Government finances.

RATIONING OR NO!

WITH summer past the halfway mark, the season is beginning when appeals to "spread the load" or perhaps "use less electricity" are pressed upon the consumer. No one doubts the need for more exhortation, but recently a stringent note has crept into speeches on this issue. Mr. Noel Baker, normally of a quiet turn of phrase, spoke forcibly a few weeks ago of the "senseless waste of electric light, electric fires, and so on." Of greater significance were Lord Citrine's remarks at Brighton. "We are coming nearer the position when arbitrary action enforcible by law, may have to be taken by the Government to secure a substantial reduction in consumption." The B.E.A. have no great love for rationing, nor have they power to impose it without legislative authority, but they have a dossier well filled with experiences of rationing overseas which is presumably available to the Minister, with whom the final decision rests. Rationing, however,

does nothing to solve the peak problem, it may well aggravate it. It will be no more than a potent admission of lack of fuel and the situation hardly seems to be so bad as to justify so drastic a step. Nevertheless, the consumer should be reassured on this point. He has before him the recent example of dividend limitation which hits more severely those who voluntarily conform with the Government's behest and he may feel that with a possibility of rationing based on previous consumption it is unwise voluntarily to restrict consumption.

ALUMINIUM USAGE

THIS country has always been in a strong position regarding copper supplies but not so today, and the high price, quite apart from the question of availability, is turning thoughts towards the greater use of aluminium. While we have had plenty of experience of aluminium conductors at the higher voltages, this has not extended to the wider use found in some other countries where even aluminium house wiring has been used extensively. As the end of the copper shortage still seems far off, the electrical industry might well prepare for an increasing use of aluminium conductors. The main differences from copper are their larger dimensions and lighter weight for equivalent conductance, and the difficulties of soldering. Apart from the greater use of mechanical joints, improved techniques have enabled soldering of aluminium to be as effective as copper, but it does require greater care and skill and the necessary standard of workmanship is itself in short supply. It would be as well, therefore, if aluminium soldering were included in training courses for wiremen. It should at least stress the importance of proper tinning.

RELIEF FOR VIEWERS

ONE year after appointment, Sir Stanley Angwin's advisory committee on interference from ignition systems has reported to the Postmaster General in favour of regulations to reduce the trouble that motor car owners may cause to television viewers. Suppression of ignition systems does not introduce the problems of inspection and access to private houses that may arise when domestic appliances and fittings come to be dealt with, and the main interest in the committee's recommendations is its inclusion of a fixed requirement as to field strength in the controlled frequency bands of 40 to 70 Mc/s. There was earlier some doubt about the practicability of writing the necessary measurements into an Order, but it seems that the committee have decided that this is possible, and have proceeded to specify a particular type of measuring equipment rather than suggest a bare, but satisfyingly simple, requirement that suppressor resistors shall be fitted in all cases. Presumably the P.M.G. will accept the report of his committee, and so interest now turns on awaiting the exact form of the regulation he drafts.

UTILITY STATIONS

THERE has been talk recently in various quarters of the desirability of building "utility" power stations as a means of accelerating the construction of power plants. It appears to be the view that by dispensing with certain undefined trimmings, power stations could be erected more quickly. It is true that such factors as stone facings are unnecessary, but it is just these extras which play no part in the date of commissioning. The B.E.A. could, of course, resort to such materials as corrugated iron, if the zinc and steel were available and the amenity experts restrained their emotions, but this would hardly accelerate the delivery and erection of boilers. Similarly, valves and pipework could be saved by reducing the stages of bleed heating, but only at the expense of efficiency. There is hardly an end to the economies that could be made, but always with a corresponding loss of something vital to a modern power plant. The truth is that since 1947 when it was decided to standardise steam conditions and ratings, the industry has been working towards the nearest equivalent of utility stations that is practicable, and few trimmings remain that can be removed without either efficiency, or reliability, or staffing conditions suffering.

Meteor

ALUMINIUM ALLOYS for OVERHEAD CONDUCTORS

Y.E.B. experience with Silmalec for 11kV scheme

By J. McCOMBE, Ph.D., A.R.T.C., M.I.E.E.

THE high price of copper conductors has made it necessary for engineers to consider alternative materials for overhead line conductors. Aluminium alloys appear to be a sound proposition, and although experience with these conductors is limited in this country, they are in extensive use abroad.

The Board with which the author is associated has erected an 11 kV overhead line with 0·1 sq in. eq (7/·183 in.) Silmalec. Silmalec is an aluminium alloy containing 0·5% silicon and 0·5% magnesium as the main alloying constituents with the remainder aluminium. The addition of these small quantities of silicon and magnesium has no effect on the corrosion resisting properties of the alloy, which are of the same order as those of electrical-purity aluminium. A strict control of the alloying constituents and also the impurities, together with special heat treatment at final gauge, results in a compromise between the standard electrical conductivity of 53·5% of the Annealed Copper Standard, and a mechanical strength of 19·2 tons per sq in. u.t.s. Silmalec is thus a strong, very durable light-weight conductor which possesses a comparatively high conductivity.

As already stated, experience with aluminium alloys in this country is limited, but from information which the author has been able to obtain, fairly extensive use of this material is made abroad. From the information available, there is at least 33,000 miles in service, and some of this was erected as early as 1924.

The basic design of the conductor erection is to the Overhead Line Regulations El.C53 (1947 revise) regarding wind pressure and ice loading. The author has adopted a higher factor of safety than the minimum given in the Overhead Line Regulations. A factor of safety of 2·2 has been used which gives a maximum working tension at worst load conditions of wind and ice at 22° F. of 3,455 lb per conductor. The author was of the opinion that the tensions, using a factor of safety of 2 were rather high and might lead to vibration troubles.

Bi-metal connectors and a cable box are in evidence on the terminal pole seen in the heading photograph.

Details of 0·1 *sq in. eq.* (7/·183 in.) *Silmalec Aluminium Alloy Conductor.*

Equivalent area	0·1 sq in.
Actual conductor area	0·184 sq in.
Overall conductor diameter	0·549 in.
Weight of conductor	0·218 lb per ft
Coefficient of linear expansion	$12{\cdot}78 \times 10^{-6}$ per ° F.
Modulus of elasticity	$9{\cdot}9 \times 10^{6}$ lb per sq in.
Breaking load of conductor	7,600 lb

The erection sag-tension chart for a 0·1 sq in. eq. (7/·183 in.) Silmalec conductor is shown in Fig. 1.

Conductor Erection

The same care should be exercised in running out aluminium alloy conductors as that for steel-cored aluminium. Running blocks with wooden sheaves should be used, and all barbed wire fences, walls, etc., should be protected with sackcloth to prevent damage. The conductor should be run off the top of the drum.

The general arrangement of the method of binding the conductors to the pin insulators is shown in Fig. 2. It should be noted that the

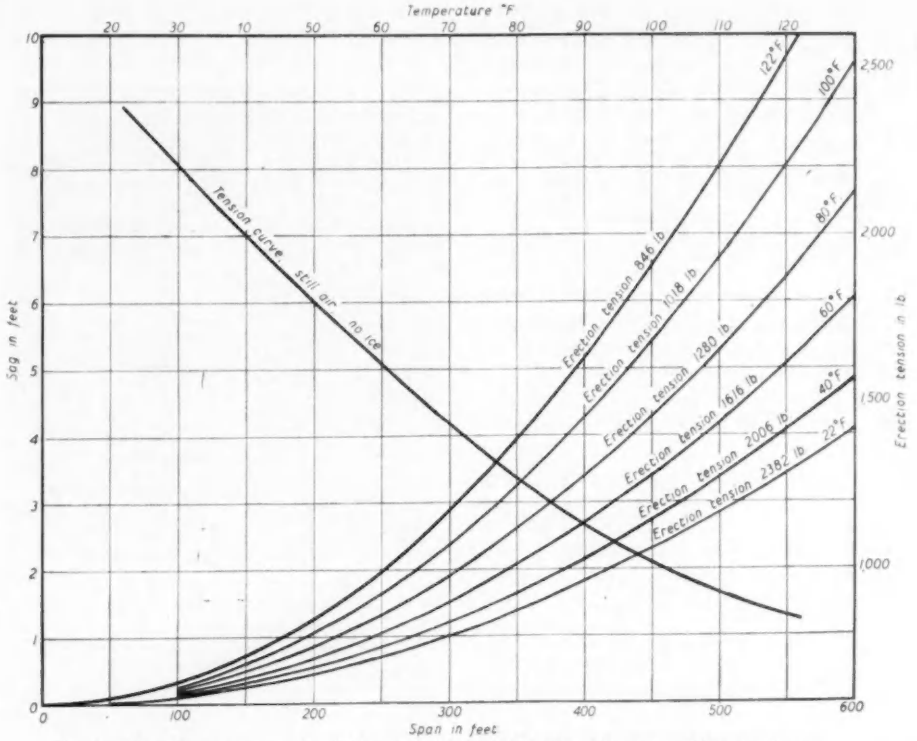


Fig. 1.—Erection sag curve for 0·10 sq in. (7/·183) Silmalec Aluminium Alloy conductor
Factor of safety 2·2, max. working tension 3,455 lb, constant tension in all spans at erection temperature, basic span 400 ft

stirrups have a long and short leg as this acts as a vibration damper. The author has found this a very effective method of reducing vibration troubles with other conductors. The conductor is wrapped with a soft aluminium tape before applying the stirrups and binding wire. The binding wire used is of half hard temper.

Conductor Terminations

There is one point to be remembered when dealing with aluminium alloys and that is they have larger diameters than the equivalent copper sizes and consequently a larger diameter clamp is required. The author found that the clamps normally used for 0·15 sq in. copper were suitable for a 0·1 sq in. eq. Silmalec. The conductors are wrapped with a soft aluminium tape before fitting the clamp. The terminal connections to the cable box, transformer or fuse gear should be made with bi-metal connectors having a pernax washer to eliminate the dangers of bi-metal action. These connectors have a filler hole and lanoline or similar suitable material should be used for filling the connectors to prevent any ingress of moisture or internal corrosion.

Mid-Span Joints

Mid-span tension joints are not normally used by the author on new construction but consideration had to be given to a suitable type of joint for use on repair work if a conductor should be damaged or broken.

The nozzle type of joint similar to that used on stranded copper conductor was considered. Two sample joints were made up and subjected to tensile tests and were found highly satisfactory. The test results showed the joint to be stronger than the conductor. The same type of joint is suitable for non-tension positions at jumpers or bows. Parallel groove clamps filled with a suitable grease can be used for making bows but the author prefers the nozzle joint. Details of the nozzle joint are shown in Fig. 3.

In making this joint with aluminium alloys, it is desirable not to plier-mark the conductors. If the overlap of the conductor is allowed to be

a few inches greater than for copper the wrapping can be effectively done without using the pliers except to remove the excess length of wrapping strands. Some protection of the joint may be necessary and initially some joints will be painted with various materials such as red lead grease paint, bitumastic paint, and some left bare. The results will be carefully observed.

The connections between the aerial earth wire and the earth connections down the pole are made with three bolt parallel groove clamps. These clamps are filled with a special grease.

Soldering of Silmalec

Where aluminium or its alloys requires to be connected to an earth plate or similar electrode at the base of the support, a terminal lug is used. This lug *must* be properly soldered to the aluminium alloy. The solder used for this is composed of 90% tin and 10% zinc. Great care must be exercised in soldering and the manufacturer's instructions must be followed in detail. The aluminium or alloy must be un-

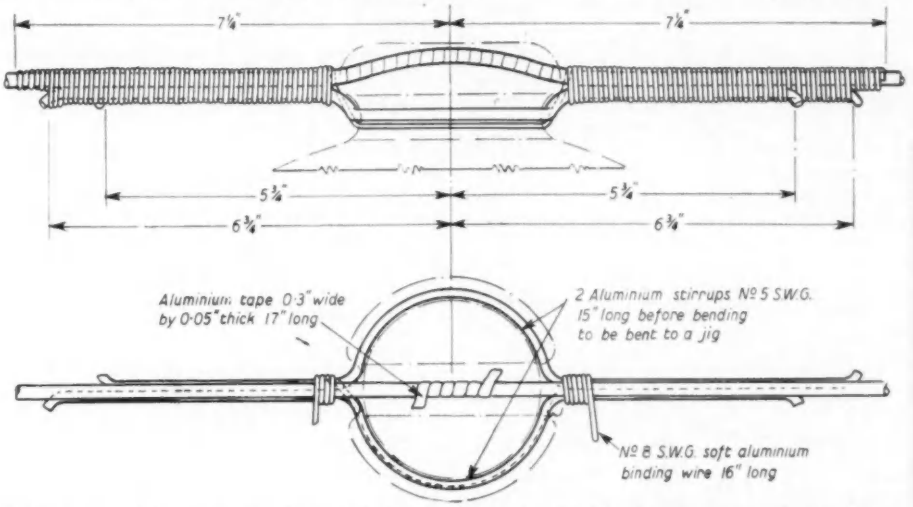

7¼"
7¼"
5¾"
5¾"
6¾"
6¾"
Aluminium tape 0·3" wide by 0·05" thick 17" long
2 Aluminium stirrups No 5 S.W.G. 15" long before bending to be bent to a jig
No 8 S.W.G. soft aluminium binding wire 16" long

Fig. 2.— (Above) Shows details of a straight line stirrup binding for Silmalec aluminium alloy conductors

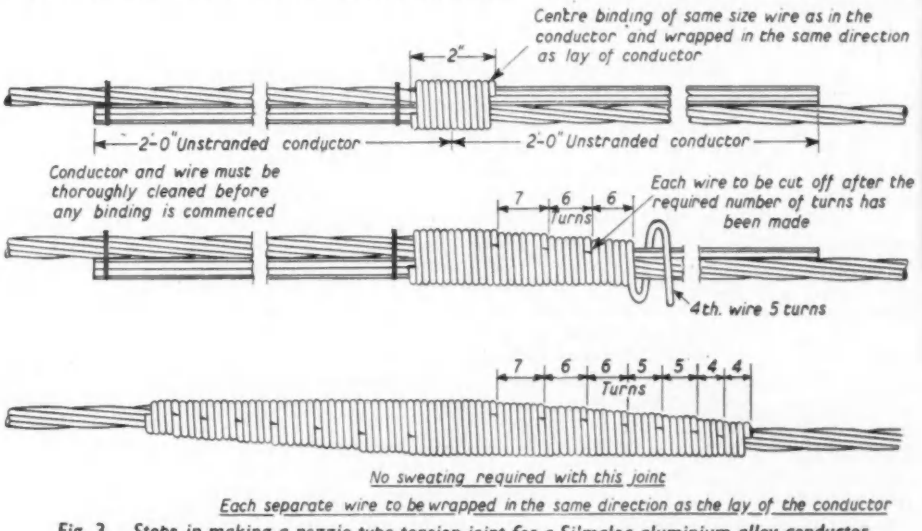

Centre binding of same size wire as in the conductor and wrapped in the same direction as lay of conductor
2"
2'-0" Unstranded conductor
2'-0" Unstranded conductor
Conductor and wire must be thoroughly cleaned before any binding is commenced
7
6
6
Turns
Each wire to be cut off after the required number of turns has been made
4th. wire 5 turns
7
6
6
5
5
4
4
Turns
No sweating required with this joint
Each separate wire to be wrapped in the same direction as the lay of the conductor

Fig. 3. Steps in making a nozzie type tension joint for a Silmalec aluminium alloy conductor

stranded, one strand at a time, for a distance of approximately 18 inches and thoroughly cleaned of any oil, grease or other deposit. A paraffin rag is useful for this purpose. The solder should be prepared in a narrow deep melting pot and each strand tinned in turn.

Details of 0·025 sq. in. eq. (3/·141 in.) Silmalec aluminium alloy conductor

Equivalent area	0·025 sq in.
Actual area	0·0468 sq in.
Conductor diameter	0·304 in.
Conductor weight	0·0557 lb per ft
Modulus of elasticity	$9·9 \times 10^6$ lb per sq in.
Coefficient of linear expansion	$12·78 \times 10^{-6}$ per ° F.
Breaking load of conductor	1,950 lb

One strand should be unstranded, cleaned and dipped into the solder. It should be scratched with a fine wire brush or similar tool while under the solder. This allows the aluminium to be tinned while in the solder as the oxide cannot form. Care should be taken to see that the end of the strand is properly scratched. The strand is removed from the solder and wiped with a clean rag. If the cleaning has been properly done the strand will be well tinned. The tinned strand is replaced and another one treated in the same way. This procedure is followed until all the strands are tinned. The lug can then be sweated in the usual way using ordinary solder. When completed the junction of the Silmalec and lug should be painted with rubber tar, bitumastic paint, red lead grease paint, or similar material. In a trial test the lug was sawn through and the joint appeared to be excellent.

Stapling to Poles

Where it is necessary to staple aluminium alloys to wood poles as is the case when running earth connections to the ground, proper staples should be used. On the line erected, staples were made from the Silmalec conductor and while these were satisfactory, it is more suitable and economic to purchase suitable staples. Staples are supplied in aluminium

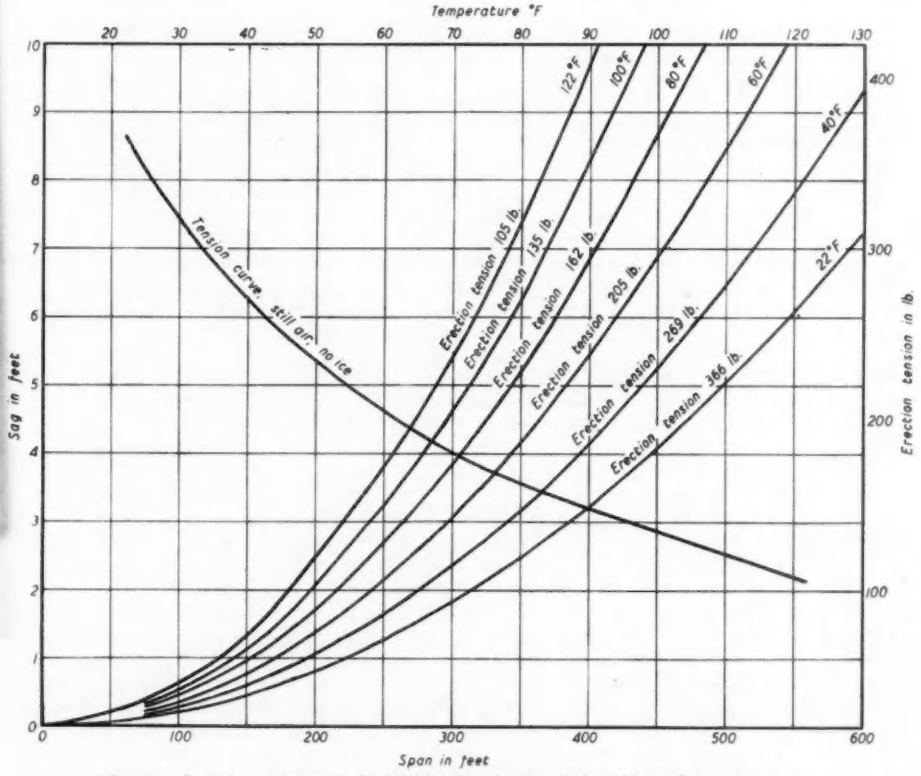


Fig. 4.—Erection sag curves for 0·025 sq in. Silmalec aluminium alloy conductor

Factor of safety 2·5 with 16 lb/sq ft windage and no ice to BS.1320: 1946, maximum working tension 700 lb, constant tension in all spans at erection temperature, basic span 300 ft

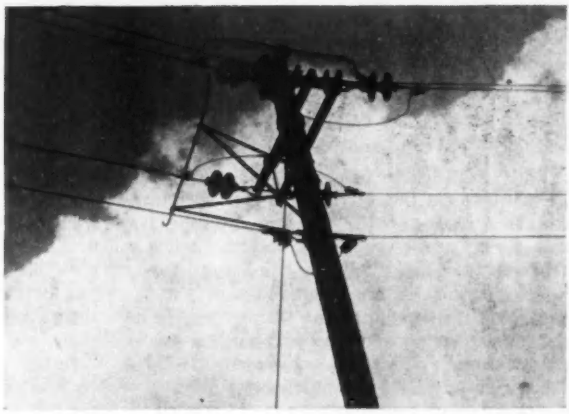


Fig. 5.—Section angle pole with line erected, showing how the non-tension bows are formed without having to cut the Silmalec conductors

alloys, and a staple 2 in. long and No. 8 s.w.g. would be suitable for 0·1 sq in. eq. Silmalec.

Fig. 5 shows a section angle pole on the line erected. It should be noted that the non-tension bows were formed without cutting the conductors. The terminal pole with cable box is shown at the beginning of the article. Bi-metal connectors were used for connecting the Silmalec to the copper terminals of the box.

Lines to B.S. 1320: 1946

The majority of spur lines up to and including 11 kV are erected to the design given in B.S.1320 : 1946. Since these lines are to supply relatively light loads, any economies which can be affected are of major importance. The conductor most commonly used on these light lines is ·025 sq in. or equivalent area conductors. B.S.1320 : 1946 recommends composite or alloy conductors up to 0·04 sq in. equivalent, but in view of the basic tensions of these conductors I would advise engineers to check up on the B.S. 1320 cross-arm designs before using ·04 sq in. equivalent conductors, either alloy or composite.

The Silmalec conductor which the author is considering at the present time is 0·025 sq in. eq. (3/·141 in.) Silmalec. The details of this conductor are given in the table opposite.

The erection design of the conductor is based on the factor of safety and wind loading given in B.S.1320 : 1946. Fig. 4 gives a sag-tension chart for ·025 sq in. eq. (3/·141 in.) Silmalec conductor.

In using any conductor, care should be taken to see that different materials are not directly joined. To engineers accustomed to using copper and who are contemplating the use of aluminium alloys, advice is given to see that there are no bi-metallic connections. Aluminium and copper directly joined gives a poor connection and the life of such joints is limited to a few years.

Too much stress cannot be placed on the importance of thoroughly cleaning all aluminium alloy wires which are to form electrical contact surfaces immediately before they are inserted into fittings. The oxide layer which forms on aluminium can build up a higher contact resistance than is found with copper.

In tinning the aluminium alloy wires it is important that the tinning should be carefully checked by wiping with the rag. The success of the method depends upon making sure that the tinned film is still molten when wiped. Care must also be taken to ensure that the strand is not too long in the solder.

Acknowledgements

The author wishes to express his grateful thanks to the Yorkshire Electricity Board for permission to publish drawings and data of work with which he is associated.

He also wishes to thank the Aluminium Wire and Cable Co., who supplied the Silmalec conductor, for their co-operation and assistance in providing technical and erection data and for the use of photographs.

In view of the extended use which is being made of aluminium and aluminium alloys for underground cable sheaths and overhead line conductors, methods of soldering will naturally develop. The author would be extremely interested to exchange views with any readers who have experience in soldering aluminium and its alloys by methods different from that described in this article. The methods adopted for the protection of soldered lugs or joints and the behaviour of such materials in practice would be very useful.

A Royal Opinion

H.R.H. The Duke of Edinburgh Addresses the Annual Meeting of the British Association

EDINBURGH is the centre for this Festival Year's meeting of the British Association for the Advancement of Science, and registration figures at the time we go to press indicate that the attendance will be more than 3,350, another record. Throughout the papers to be presented this year runs the theme "one hundred years of progress," and an appropriate start was made yesterday evening, when H.R.H. the Duke of Edinburgh, delivered his Presidential Address under the title, "The British Contribution to Science and Technology in the Past Hundred Years."

Laymen Welcome

Prince Philip began by recalling the words of the Prince Consort, when addressing the Association in 1859. He went on to suggest that the invitation to him to become president demonstrated "that science is not a magic circle and that you wish us as laymen to enter your confidence." He went on to review, first the condition of science and industry in 1851, and then, the progress in many fields in the intervening years. This survey completed, he proceeded to examine its implications.

The concrete measurement and indirect effect of all scientific effort, he said, is the general improvement in the condition in which people live and work, in the improvement in health, and in the expectation of life and in the standards of living. Not all the great progress achieved has come from science and invention, but these powers have always been beside the authors of progress, to help and sometimes to guide.

Teamwork

Science today depends much on co-operation and teamwork, but the quality of scientific work is still determined by the quality of the individual scientist. The quantity of output, however, is dependent upon the money available. Thus the scope and intensity of the progress of applied science bear a close relationship to the circumstances of the time. Technology, the combination of scientific knowledge with the practical ability of the inventor to apply that knowledge to the solution of particular problems, comes into play with any new discovery of scientific fact. Unfortunately, it moves fastest under the urgent demands of modern war.

It is far from the truth, however, to say that science has become so well established, that nothing can stand in the way of its natural growth. The natural conservatism of the laymen acts as an effective and powerful brake to the adoption of new ideas. On the other hand, there are occasional bursts of enthusiasm—"the belief in the philosopher's stone seems to be just as great as ever." What is needed for the application of the discoveries of science to the full benefit of people generally, is trained technologists. It is to be hoped that the new and rather uncertain science of education will develop sufficiently quickly to point the way to a speedy solution of this problem.

Full Programme

The Duke's address came after a graduation ceremonial at which he received the Honorary Degree of Doctor of Laws in the University of Edinburgh. To enable the maximum possible number of delegates to see the proceedings, a closed link television relay was arranged by Cinema-Television between the two halls in use, large screen technique being used.

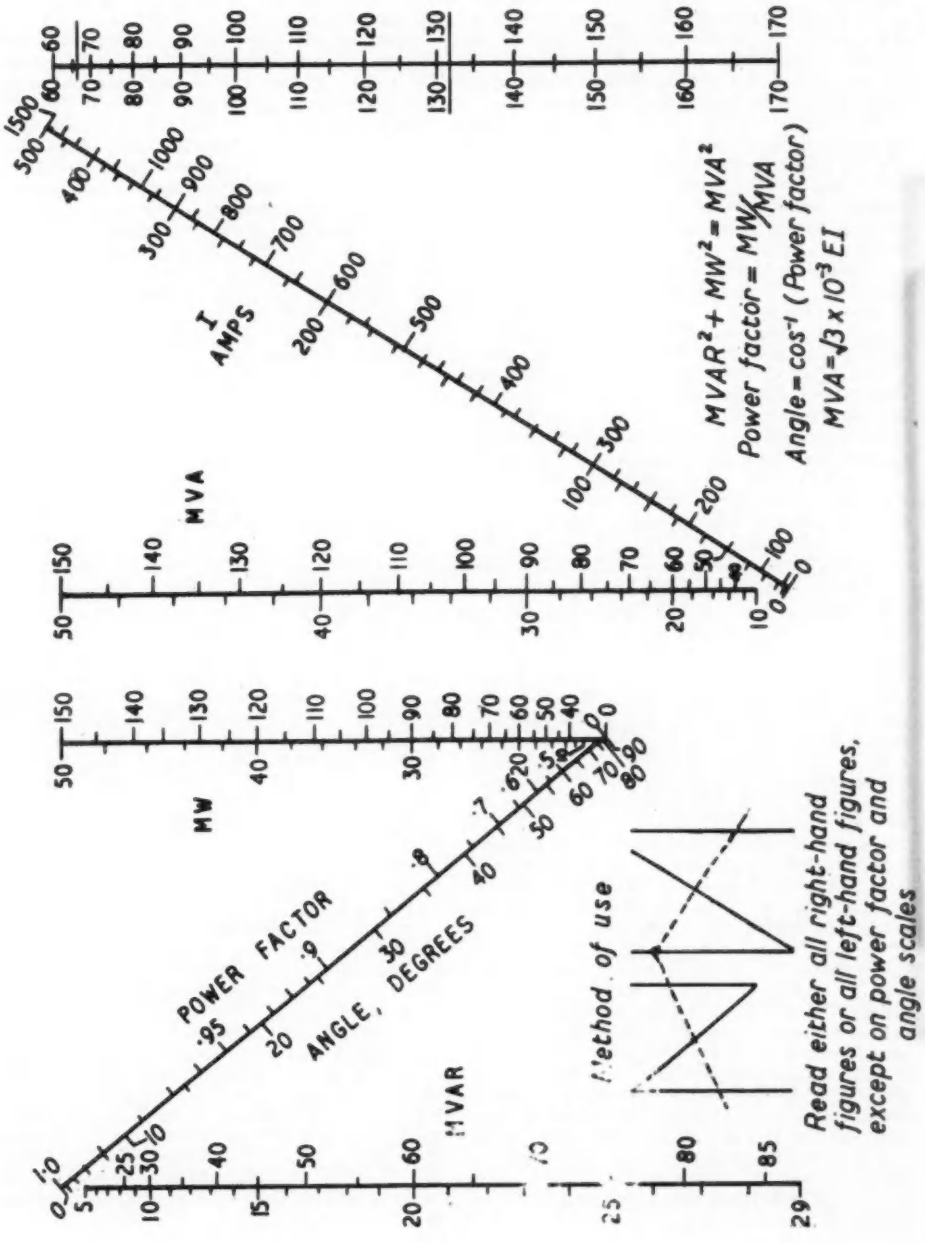
For the rest of the week delegates to the meeting have a very full programme before them, up to the final proceedings, on Friday week. The principal papers of interest to the industry were listed in the Electrical Times on 19 July, and will be reviewed in a future issue. The Engineering section presidential address will be delivered tomorrow morning by Sir Claude Gibb (C. A. Parsons) under the title "Two thousand years of engineering."

In addition to the meetings, a comprehensive programme of outings has been arranged, with the accent on both scenic and scientific interest in the country surrounding Edinburgh. Amongst the engineering firms which are planning to entertain parties from the B.A. meeting are: Bruce Peebles & Co., Ferranti Ltd., and the Harland Engineering Co. In addition, there are to be trips to Loch Sloy and to Portobello power station.

Unlike most of the sections, the engineering section of the Association is not holding a dinner, but has arranged instead a Conversazione, which is to be held on Monday evening at 7.30, at Heriot-Watt College.

POWER CALCULATION NOMOGRAM

Devised by D. Hanstead


I AMPS
MVA
MW
POWER FACTOR
ANGLE, DEGREES
MVAR
MVAR² + MW² = MVA²
Power factor = MW/MVA
Angle = cos⁻¹ (Power factor)
MVA = √3 x 10⁻³ EI
Method of use
Read either all right-hand figures or all left-hand figures, except on power factor and angle scales

SCIENTISTS ADVISE GOVERNMENT

SHORTAGE of scientists on a short-term basis, the need for employing highly qualified scientists in leading executive positions, and the importance of keeping fuel economy research going in spite of atomic energy developments: these are the outstanding points discussed in the Fourth Annual Report of the Advisory Council on Scientific Policy published last week (cmd. paper 8299, H.M. Stationery Office, price 9d.).

The terms of reference of the committee, which sits under the chairmanship of Sir Henry Tizard, are "to advise the Lord President of the Council in the exercise of his responsibility for the formulation and execution of Government scientific policy." In the report, it is explicitly stated that the term "scientist" is taken as "embracing engineers and technologists trained to graduate level or its equivalent either in universities or in technical colleges."

Excess of demand over supply of scientists will be mainly the effect of the rearmament programme, for the 11,000 students now in the applied science departments of universities is over double the number before the war. Discussing plans for higher technological education, the report comments that the 1950 Report of the National Advisory Council on Education for Industry and Commerce received a "mixed reception." Expressing some sympathy with certain of the criticisms made, the present report does support the idea of an award separate from university degrees: but it puts the importance of expanded facilities for higher technological education in first place.

Increased demand will be made on British science and education by the implementation of the Colombo Plan for assisting the economic development of South and South-east Asia. Requests may come for scientific assistance, and these, it is felt, should be examined by the various Governmental research councils, with a view to preventing isolation of scientists impairing the value of work done in the East.

On atomic energy, the Advisory Committee's view is that there is a reasonable prospect that atomic power can be developed on a large scale, and that the cost would not ultimately differ widely from that of power derived from coal. Development at the moment is mainly dependent on advances in metallurgy now proceeding.

After a full discussion of the problem, it has been concluded that the development of atomic power stations to the stage where they can contribute substantially to the power resources of the country is likely to take a generation at least. Conditions in other parts of the world may, however, be favourable to earlier development.

W.P.C. PROGRESS

THE Annual Report of the World Power Conference for the year 1950 has just been published by the Central Office of the organisation at 201-2 Grand Buildings, Trafalgar Square, London W.C.2. President of the Conference is Sir Harold Hartley and chairman of the International Executive Committee is Sir Vincent de Ferranti.

The Fourth Conference was held at London between July 10 and 15 last year, and was attended by 1,339 full members and 290 "accompanying persons" coming from 53 different countries, making a grand total of 1,629. One hundred and fifty-six papers were presented by 28 National Committees. The great majority of these papers were in English or French, but a few were in German or Spanish. All papers were accompanied by summaries in English and French. Six papers, presented by the National Committee of the U.S.S.R., arrived too late for publication in pre-print form and will be included (in English translation) in the bound Transactions. Preprints of the majority of the individual papers and of all the General Reports are still available separately, and will be sold as long as stocks last. An almost verbatim report of the discussion on Section J, "Atomic Energy," was published as a separate pamphlet in October, 1950, and copies are available price 2s. post free. The "Transactions of the Fourth World Power Conference" are in course of preparation and publication is expected late this summer; they will comprise five volumes. An account of the Sectional Meeting held at New Delhi earlier this year will appear in the Annual Report for 1951.

The Non-Governmental Organisations' Committee of the Economic and Social Council of the United Nations adopted a recommendation transferring the W.P.C., among other organisations, from the list of bodies enjoying Category B Consultative Status to the Secretary-General's Register. The Central Office believes that an error of classification has been made by the Organisations' Committee due to a belief that the W.P.C. is more highly specialised than is in fact the case.

Income during 1950 fell short of expenditure to the extent of £261 0s. 4d., reducing the accumulated surplus to £230 18s. 3d. Contributions from the National Committees amounted to £2,340, while the figure given in the Budget was £2,460. This shortfall was wholly due to the inability of certain National Committees to obtain permission from their respective governments to remit sterling to London.

Circuits for METAL RECTIFIERS*

Relative Advantages of Various Schemes

By G. E. B. WHITE,** A.M.I.E.E., D.I.C., M.A.E.T.

ALTHOUGH there are few pieces of electrical apparatus more simple and straightforward—to all external appearances—than the metal rectifier, its actual physical operation is quite complex, and the number of different forms and styles which have been developed are legion. In the same way, there are many different methods of utilising rectifiers all making use of its basic properties in a different manner. There is frequently a wide variation between the efficiency and suitability of different methods for a given application which is not obvious at first glance, and the choice of a particular method often requires considerable thought, in addition to a knowledge of the characteristics of the various circuits. Efficiency may not always be the prime requirement; there are often cases where, particularly on light current circuits, a negligible increase in efficiency may be obtained by a considerable increase in the first cost of the rectifier itself or its associated transformers. In the circumstances, it is felt that some information on the characteristics of the various circuits would not be out of place.

Single or Polyphase?

The first decision to be made is whether to use single or three-phase rectification. A single-phase rectifier is usually more economical for low current outputs, but for higher outputs a three-phase unit will be found cheaper, in addition to its advantage of providing a balanced a.c. load.

Normally the economic line of demarcation between single and three-phase is between 1·5 and 3 kW but this is often influenced by the standard frame size of rectifier available. Another factor which may have a bearing on the first cost is the presence or absence of transformer tappings, both these and their associated switches being more costly for three-phase units. The necessity for smoothing is yet another factor to be taken into account. Since the output of a three-phase rectifier is inherently smoother than that of a single phase, the necessity for a larger smoothing unit may turn the scales against the single-phase unit.

Single-Phase Circuits

Some of the circuits used in practice are shown in figures 1-5. The plain half-wave rectifier using a single unit is not often used since it does no more than suppress one half-wave completely and its output is not even approximately continuous.

Half-wave rectification in conjunction with a reservoir condenser is sometimes used, the connections and wave form being as shown in Fig. 1. This circuit is mainly applicable to low current outputs such as are met with in radio, television, and other electronic circuits. If the voltage required is not the natural rectifier voltage, and it is necessary to employ a trans-

* Sequel to article "Developments in Metal Rectifiers" published in the ELECTRICAL TIMES, May 31, 1951, p. 901.

** Westinghouse Brake and Signal Co., Ltd.

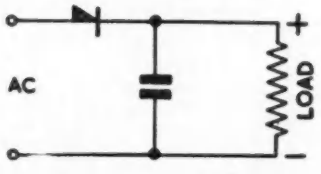
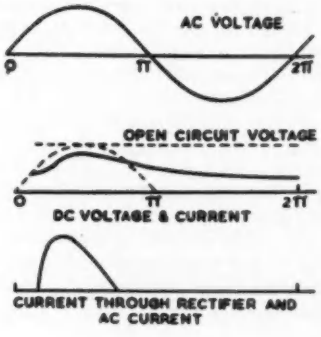
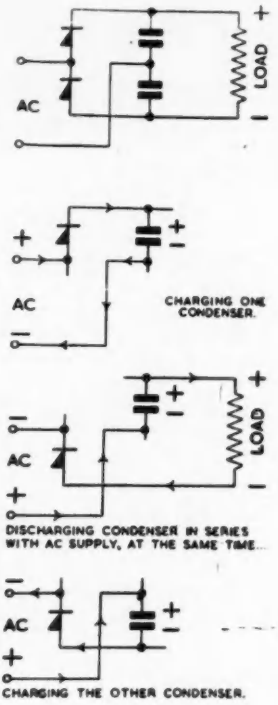


Fig. 1.—Circuit diagram and voltage and current waveform for half-wave rectifier with reservoir condenser. Note drooping voltage characteristic and asymmetric current waveform




AC
LOAD
CHARGING ONE CONDENSER.
DISCHARGING CONDENSER IN SERIES WITH AC SUPPLY, AT THE SAME TIME.
CHARGING THE OTHER CONDENSER.

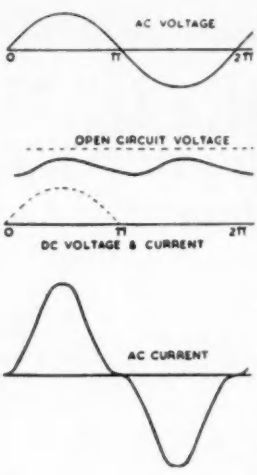


Fig. 2.—On left, diagram of connections for voltage-doubler circuit showing how one condenser is discharged in series with the rectifier voltage at the same time as the other is charged. Note asymmetric voltage waveform and non-sinusoidal (peaked) current wave

former, it is essential to allow for a wide range of voltage regulation caused by the "peaky" current waveform obtained.

Voltage-Doubler

Where a high voltage is required at a low current, the voltage-doubler circuit may be employed, as shown in Fig. 2, which operates by charging one condenser on each half-cycle, the voltage across it being added to that of the supply on the next half-cycle. Where the steep voltage regulation caused by the impedance of the series condenser is not an objection this circuit may be of use, in fact the limited short circuit current may sometimes be an advantage.

An extension of this arrangement is the Westinghouse patented circuit known as the "Westeht" shown in Fig. 3. By the use of a "ladder" of condensers cross-connected by rectifiers it is possible to obtain very high voltages from a medium supply, the standard unit producing 5-6 kV from a 350-0-350 V centre-tapped transformer. This is suitable for the anode supplies to cathode-ray tubes, a particular advantage being the elimination of the necessity for a transformer which has 5-6 kV on one winding and a cathode heater winding as well.

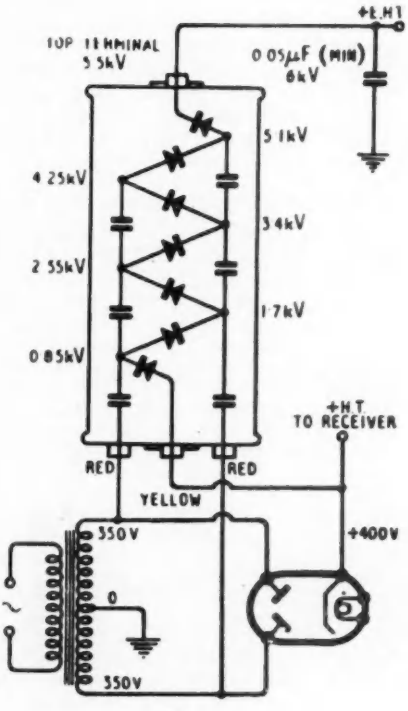
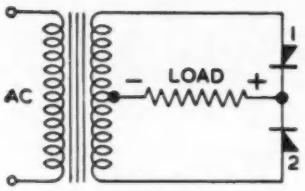


Fig. 3 (below).—Diagram of connections of "Westeht" unit showing extension of voltage-doubler principle by a "ladder" of condensers and rectifiers to give nearly 6 kV from a 350-0-350 V transformer



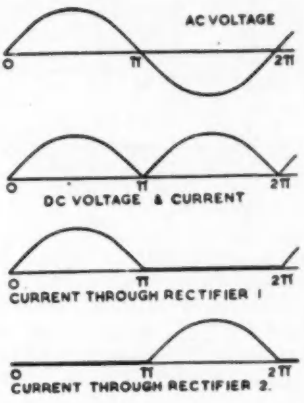


Fig. 4.—Diagram of connections and current and voltage waveforms for single-phase centre-tap unit

Centre-Tap

The centre tap connection shown in Fig. 4 is seldom employed except for small outputs at voltages below about 6V. Its chief disadvantage is the extremely uneconomical design, since the secondary must be wound for twice the required voltage and at any given instant only half the transformer is effectively in use.

Bridge-Connected

The most useful rectifiying circuit of all and the most commonly employed is the bridge connection which can be employed without any transformer at all, unless the natural d.c. voltage of the circuit is unsuitable. For this arrangement the simplicity of the metal rectifier is seen to its full advantage, since a valve rectifier would need several separate transformer windings. The efficiency of this form of rectification, and the regulation is the same as the centre-tap arrangement without the disadvantages of the transformer design.

Three-Phase

For all high-power work, the most economical is the three-phase bridge circuit as shown in Fig. 7 which also shows the wave form obtained. Here again, if the natural voltage of the supply is suitable, no transformer is required. Where the required d.c. voltage differs from this, the transformer is of standard, economical design, and it is not necessary to have the neutral point available, which can often be a considerable advantage in itself.

Three-Phase Half-Wave

For plating circuits and for any low voltage heavy current application, it may be found that the half-wave circuit, shown in Fig. 7, is more suitable than the bridge connection, the chief consideration being the actual voltage required. When the d.c. voltage is half—or less—than that obtained from a single element in a bridge circuit, the half-wave arrangement will be found more suitable, giving better regulation and a higher efficiency.

The transformer design is fairly complicated and the utilisation factor is low but where heavy currents necessitate a number of plates in parallel, there is a distinct overall saving.

Rectifier Testing

Before leaving the subject of rectifier circuits, it may be opportune to consider one or two points which—elementary as they may seem—

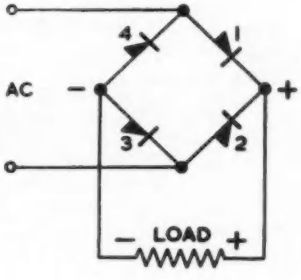
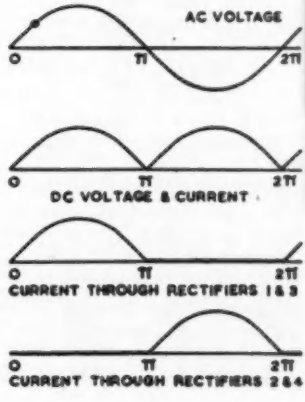
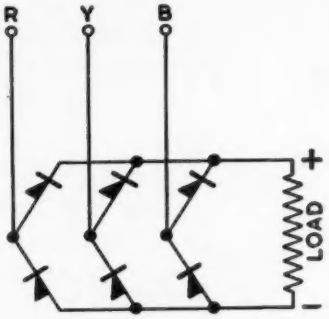


Fig. 5.—Most widely used of all — the familiar single-phase bridge connection giving full-wave rectification without transformer





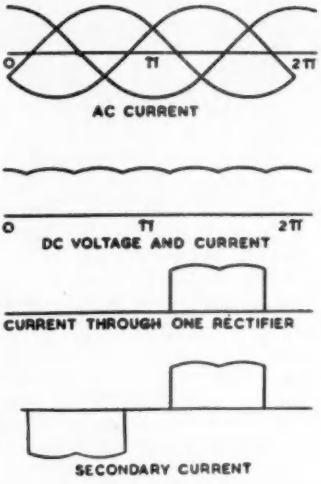
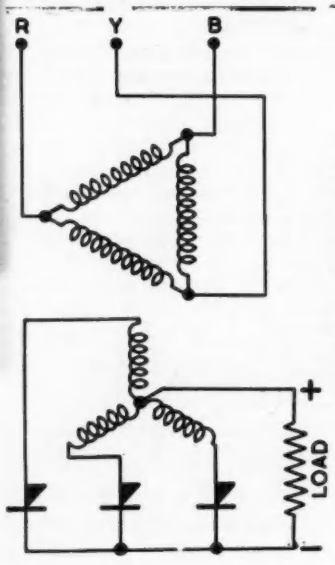


Fig. 6.—Diagram of connections and current and voltage waveforms for a three-phase bridge-connected unit. Note the comparative steadiness of the d.c. voltage, requiring only a small amount of smoothing

are often overlooked when rectifier units are being tested for efficiency.

Firstly, moving coil instruments should be used for all d.c. measurements, rather than moving iron or dynamometer meters. The d.c. output is by no means a steady value, but has a wave form of its own, and m.c. meters will read average while m.i. and dynamometer types will read r.m.s. values. Since the waveform, particularly with single phase rectifiers —varies widely with the types of load, it is not possible to correct for a form factor, and some surprising figures for efficiency may be obtained if this point is overlooked. By the same token, the current and voltage waveforms of the output may be not in phase with each other and it is quite possible to have that contradiction in terms, a "d.c. power factor," since the watts may not equal the volt-amps.

An ohmmeter is useless except for continuity testing, readings of resistance values being quite erroneous. The same applies to a high voltage testing unit of the "Megger" type with the additional possibility of puncturing the rectifying surface and causing complete breakdown.



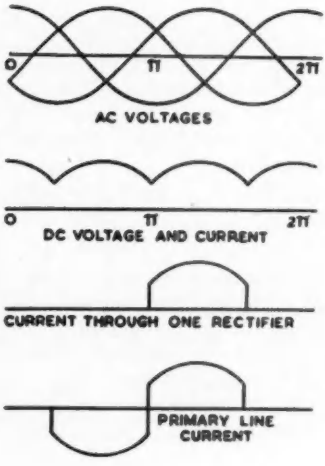


Fig. 7.—Diagram of connections and current and voltage waveforms for a three-phase half-wave unit. Although this method requires a transformer and its output is "rougher" it is frequently preferred for low-voltage circuits

Notes on Wiring by MEGOHM

Compulsory Suppression

Refrigerator Rules likely to come next

THE Wireless Telegraphy Act, 1949, provides for the abatement of undue interference with Wireless telegraphy for sound and vision. The Act states "Any person who uses any apparatus for the purpose of interfering with any wireless telegraphy shall be guilty of an offence under the Act" and provision is made in the Act for penalties and legal procedure against infringement.

In accordance with provisions in the Act, the Postmaster General announced in the House of Commons in July 1950, the Constitution of Advisory Committees nominated by the President of the Institution of Electrical Engineers with the approval of the Council, for ignition systems, and refrigeration apparatus.

The recommendations of the Advisory Committee on wireless interference from refrigeration apparatus, when published, will be of particular interest to installation engineers in view of the fact that commutator motor driven apparatus has been the source of annoyance and upset to good reception of television, especially in large blocks of flats.

Past Ideas

The safety and cost of providing and fitting suppression equipment has received attention in the past, and may be briefly summed up as follows :

It is essential that the non current carrying metal framework of the apparatus is properly and solidly earthed to ensure safety. In the event of a breakdown in the capacitator which is connected between the live pole and the metal framework of the apparatus, the risk of shock to persons in contact with the frame, which would become alive if unearthed, would be most dangerous. An alternative method of protection to earthing is double insulation, but this would appear to be more costly.

Providing the metal framework of the apparatus is properly installed, earthed and maintained according to I.E.E. Regulations for the Electrical Equipment of Buildings, no shock risks will be incurred in fitting capacitators, which of course should be in accordance with B.S.613.

The estimated cost to the purchaser for the fitting of suppression equipment to commutator driven domestic refrigerators during manufacture ranges between 25s. and 30s. each, and cost of fitting suppression equipment to domestic refrigerators installed in premises is approximately double these figures. From this it is evident that suppression equipment should be fitted during manufacture for economy.

Who's to Pay?

On reference to the Act, provision is set out that the Postmaster General has to decide whether all reasonable steps have been taken to minimise interference by the station or apparatus receiving wireless telegraphy.

In this connection an interesting point arises. Let us assume a tenant in a block of flats has a television receiver which is operating quite satisfactorily with an indoor aerial, and at some later date another tenant in an adjoining flat has installed a commutator motor driven refrigerator which is not fitted with suppression equipment. In consequence, interference to television reception is most pronounced and traced to the offending machine.

I wonder what the Postmaster General's decision in such a case would be. Would he say the indoor aerial system is inefficient and the tenant should take steps to improve the efficiency of his aerial system, such as connecting his receiver to the communal aerial system at a probable cost of £5 per annum, or would he say the offending refrigeration should be fitted with suitable suppression equipment at a probable all-in cost of £2 10s ?

The classification of radio noise levels I understand is also receiving attention for incorporation in the proposed revision of British Standard 800/1939. Radio noise levels are classified as discontinuous noise and continuous noise. Experimental tests have indicated that repeated bursts of interference of some duration but less than 2 seconds can be as troublesome as continuous noise. It is therefore suggested the time factor should be reduced from 2 seconds to one fifth of a second to simplify distinction between discontinuous and continuous noise.

Expanding Singapore's Undertaking

SHORTAGE of suitable staff would seem to be a difficulty which is adversely affecting the operation of the Singapore Municipal electricity undertaking, according to brief details of the operations during 1950, sent us by Mr. C. C. Payne, the municipal electrical engineer. He points out that maintenance of supply was due in no small measure to the long hours worked by both power station and distribution staff. In point of fact, load shedding took place on 58 occasions totalling 141½ hours during 1950, caused by plant shortage—an average of 2·44 hours per outage.

But without any increase in the plant installed (37 MW), units generated in the twelve months increased by 17·93% to 28·3 million, while the peak load also rose by 2,500 kW to 34,500 kW.

Hired appliances were again popular, favourite being fans, of which a further 2,925 were hired, and cookers put out numbered 741. Another 415 water heaters were also hired.

The Distribution Section, too, had a busy year during which 29,315 yards of 22 kV cable and 18,967 yards of 6·6 kV cable were laid, in addition to 41,956 yards of 660 V mains.

The work of the Public Lighting Section was affected by delay in deliveries of concrete poles, yet 783 lamps were erected in the year. Here, too, examples of fluorescent street lighting have drawn favourable comment. The meter section put a further 6,887 meters in service, while the work of checking installations and consumers' services and the resealing thereof continued. With a total of 16,214 the 1949 figure was improved by 2,415—an encouraging increase accomplished without additional technical or artisan staff.

The year covered by the Report is also noteworthy in that during the period contracts valued at over $18 million were awarded for plant for the new Pasir Panjang power station. The largest contract, for the civil works for the first section, was awarded last November to George Wimpey and Co., at a cost of $9,618,563. The order for the steelwork, valued at $2,100,000, went to Redpath Brown and Co.; for boilers and pipework, costing $1,627,714, to Babcock and Wilcox; for main and auxiliary switchgear, at a cost of $2,508,480, to A. Reyrolle and Co.; and for oil storage plant, valued at $746,529, was awarded to Whessoe Ltd.

The Municipal Commissioners also approved the call for tenders for plant as a first extension to the Pasir Panjang station, comprising two 25 MW turbo-alternators and two 187·5 klb/hr boilers together with a 2,000 kW gas turbine driven alternator as house set. This plant is to be installed during 1954/55, at an estimated cost of $17 million and will bring the total capacity of the new power station up to 100 MW.

SOUTHERN BOARD STANDARDISES TARIFFS

IN accordance with the provisions of the Electricity (Supply) Act, 1947, which *inter alia* charges the Electricity Boards with the duty of simplifying and standardising tariffs, the Southern Electricity Board has now issued details of the standard domestic tariff, which is to come into operation from the first normal meter reading taken on or after October 1, 1951.

Two unit prices are prescribed: the first will be charged for an initial number of units related to the number of rooms in the premises, and the second and lower price will be charged for the balance of units consumed.

Details of these tariffs are: (1) where the dwelling house contains four or less than four assessable rooms, supplies given through credit meters will be charged at 5d./unit for the first 40 units in the same quarter, and 0·875d./unit for each additional unit. With prepayment meters, the first 40 units will be charged at 6d., the excess remaining at 0·875d.

(2) Where the dwelling house contains more than four assessable rooms, the number of initial block units is derived by multiplying the number of rooms by 10 and the prices are 5d./unit for the initial block and 0·875d. for each unit in excess. This is for credit meters. For prepayment meters, the number of units in the initial block is derived in the same manner, but the first 40 only are charged at 6d./unit, the remainder in the initial block at 5d., and all excess units are charged at 0·875d./unit.

These tariffs do not apply to temporary or seasonal supplies, where the price will form the subject of special quotations dependent on the individual circumstances.

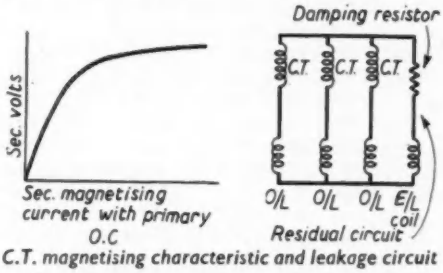
No meter rents will be charged for the hire of meters required to register the value of the supply, but a rent will be charged for any additional meter installed at the express wish of a consumer.

The definition above of assessable rooms is naturally of importance, and for the purpose of the tariffs, all rooms are assessable, whether used or not and whether wired for electricity or not, with the following exceptions: entrance hall or vestibule (except where used as lounge or sitting room); larders, sculleries (if additional to kitchen or kitchenette); cloakrooms, closets, lavatories or w.c.s; bathrooms, attics without access by permanent staircase; store rooms; box rooms or cellars, if such rooms or cellars are without external windows; central heating chambers; wash-houses; coal stores or coal cellars; garages and greenhouses.

Problems and Practice
IN ENGINEERING

Motor Earth Relays

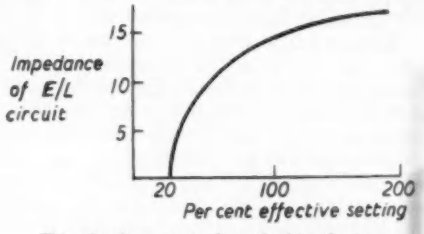
FURTHER to my note in the ELECTRICAL TIMES of June 28, 1951, some interesting points have arisen in connection with the mal-operation of the earth leakage elements. As stated before, the trouble is chiefly due to the saturation of the current transformers, a condition which is aggravated by the inclusion of ammeters and instruments in the protective circuit. This is particularly the case if the instruments are remotely situated with long lengths of pilots, thereby increasing the burden on the current transformers. A further cause is the specification of lower ampere turn current transformers which saturate at about 17 V, whereas c.t's can be installed which saturate at 30 to 40 V on the secondary side. Furthermore, the effect of long leads and damping resistors



C.T. magnetising characteristic and leakage circuit

on the % setting of the earth leakage element may be calculated as follows.

Let us assume that we have a damping resistor of 10 ohms, and the impedance of the e/l element is 2 ohms, its operating current being one amp, i.e. 20% with a 5 amp c.t. The total impedance of the residual circuit is then 12 ohms and the voltage required to operate the relay = I × Z = 1 × 12 = 12 V. From the magnetisation curve for the c.t., a secondary pressure of 12 V requires a magnetising current of, say, 0·4 amp. Now if one c.t. carries a fault current in the primary conductor and delivers



This check curve is described in the text

a higher secondary potential, it will pass a corresponding current through the other c.t.'s as well as an operating current through the relay. The total current delivered by the c.t. carrying the earth fault current will be 3 × 0·4 + 1 = 2·2 amp. As a secondary current of 5 amp is equivalent to 100% setting, 2·2 amp is 44%

The % setting corresponding to several other values of resistance should be similarly calculated and a graph plotted, as shown herewith, to ensure that the value of resistance fitted does not impair the operation of the relay. These calculations neglect the effect of phase angle error which is appreciable in the case of low ratio c.t's, reducing the % setting by approximately 10% before the knee of the curve and 30% afterwards. In the case of higher ratio c.t's, however, the effect is negligible.

Generally, relay settings are only considered in connection with fault conditions, but a relay is a burden on a c.t., even under normal load, especially in the case of an overload relay where the relay current is proportional to the load current.

Calculation of full load volt-ampere burden on Current Transformers

Relay %	Setting amp	Sec. amp and volts for 3 VA burden	Volts required from c.t. to pass 5 amp in sec. circuit	Burden on c.t. when normal f.l. current flows, i.e. 500 amp primary, 5 amp sec. = 5 × volts required
200	10	10·00 A at 0·30 V	0·150 V	0·750 VA
175	8·75	8·75 A at 0·34 V	0·195 V	0·975 VA
150	7·50	7·50 A at 0·40 V	0·268 V	1·340 VA
125	6·25	6·25 A at 0·48 V	0·385 V	1·925 VA
100	5	5·00 A at 0·60 V	0·600 V	3·000 VA

The VA burden of a relay at normal fall load current, 100% setting, is stated by the makers, and the burden at other settings may be calculated and tabulated as shown. The example taken is the case of a 500/5 c.t. with a 3 VA relay connected to it.—*I.G.*

Faulty 110-volt Release

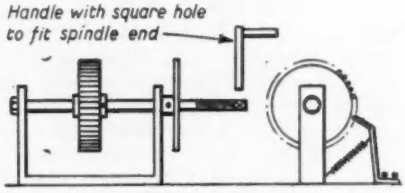
RECENTLY, in our works plant at the start of the shift, the engineer made a report regarding a d.c. single-pole circuit-breaker. The report was that after the mill motor had been running for about a minute the plunger of the no-volt release dropped and tripped the circuit-breaker. The plunger of the no-volt release should only have dropped on an overspeed or a failure of supply. It was assumed that there was an open circuit somewhere in auxiliary circuit, which consisted of an overspeed device, economy resistance, and a no-volt release. With the aid of an ammeter a test was applied through the circuit with the circuit-breaker closed. To keep the circuit-breaker closed the plunger was held up by hand. Throughout the test the ammeter reading remained quite steady and was the current marked on the no-volt release plate. Although there was a slight magnetic pull of the plunger it was noted while the motor was running that there was a slight vibration, which it would seem had a tendency to dislodge the plunger from its sustained position. When the plunger was removed, it was observed that the brass distance piece was slightly buckled and was not entirely against the face of the plunger. This abnormally increased the air gap of the magnetic circuit, weakening the magnetic flux and so reducing the pull of the plunger. The brass washer was removed and another of the same thickness was replaced into its proper position. On reassembling, a test was applied and operated O.K.

It was later explained that the washer had been inserted during the previous shift, when it had been found that the no-volt release was failing to drop because of residual magnetism. Evidently, it had been too neat a fit.—*Novis.*

Coil Winder

A BENCH device suitable for winding armature, interpole, and series coils was required at short notice, and after a little thought, the following arrangement, as sketched was evolved from scrap. The frame was bent up from 2 in. by $\frac{1}{2}$ in. m.s., its base drilled to take two $\frac{3}{8}$ in. holding down bolts, and the uprights drilled to accommodate a $\frac{3}{4}$ in. steel bolt comprising the spindle.

The ratchet wheel was simply an old lathe change wheel with its oil hole drilled out and tapped to take a $\frac{5}{16}$ in. locating screw. A circular face-plate was cut from $\frac{1}{4}$ in. m.s. plate by an oxy-acetylene torch, a $\frac{3}{4}$ in. hole drilled through its centre, and a suitable collar with clamping screw welded thereto. Various holes were then drilled in the face-plate to take pegs, etc., attached to the wooden and metal coil formers.



Improvised coil winder

The ratchet click was bent from $1\frac{1}{4}$ in. by $\frac{1}{4}$ in. m.s. as shown, and secured to the bench by two $\frac{1}{4}$ in. bolts passing through its base. To avoid the need for hingeing, the holding down bolts were left slack, and the click pulled into engagement by means of a tension spring secured by suitable holes drilled in the click and frame.

The end of the bolt-cum-spindle was squared and manual rotation provided by means of a suitable crank handle with matching square hole.—*F.R.S.*

Fitting Fluorescents

USUALLY, in small establishments, the failure of a fluorescent light means calling in an electrician, even though the fault may be only a lamp failure, and in premises where one fitting is the only source of light, the consumer is put to considerable inconvenience pending his arrival. In such cases I have found it useful when installing the fluorescent, to feed it via a 2-amp, 3-pin socket outlet mounted directly above it, and to supply the consumer with a length of flex with a plug on one end and a lamp-holder on the other. In the event of a failure of the fluorescent he can then easily disconnect it and plug in a tungsten lamp as a temporary measure. This arrangement also, of course, facilitates the removal of the fitting for cleaning, repairs, etc.—*J. D. South.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

Flash Welding Technique

Application to Ferrous Metals

OF interest to all engaged in production or repetition welding of ferrous metals is a booklet on the "Industrial Use of Flash Welding dealing in particular with Ferrous Welding," published by the British Welding Research Association of 29 Park Crescent, London W.1, price 2s. 6d.

An introductory section gives a brief description of the mechanism of flash welding as opposed to resistance butt welding. The capabilities and range of application of flash welding are reviewed, and the general types of machine, manual, semi- and full-automatic are briefly dealt with, and advice is given on the various types of heat-treatment which may be required to ensure good jointing.

Electrical Considerations

In dealing with the electrical side of the process, it is well to run briefly through the welding cycle. The two pieces of work to be joined are held in clamps insulated from each other. A voltage is then established between the work pieces and the faces brought towards each other. Upon contact, the welding current first flows through small sections of the faces where intimate contact has been established, and causes local heating and burning. This in turn heats up the metal immediately behind the contact faces. When satisfactory conditions have been attained, the two pieces are forced together under pressure; the burned and molten metal is expelled, and the back metal forms the actual weld.

Welding current is generally obtained from a transformer, with a primary winding tapped to provide a series of steps of adjustment to cope with a reasonable range of sizes of workpiece. Where a specially wide range of work must be welded on one machine, an auto-transformer can be used to provide a greater range of adjustment than is practicable with the tapped primary of a welding transformer.

The open-circuit voltages used in flash welding lie in the range of 2 to 20 V dependent on the type of work being done. It is, however, pointed out that the actual secondary current depends on so many factors that it is not possible to give values which could act as a guide when setting up the machine. Furthermore, there are at present no reliable means of measuring the secondary current.

The transformer used is usually single-phase and connected across two phases of the l.t. supply. Suggestions are given as to information to be given to the supply authority when installing flash-welding equipment. These include the kVA rating of the machine and preferably a loading graph giving details of the load taken when the machine is working at its maximum capacity.

As the kVA rating of flash welding machine transformers is usually assessed on a single-phase intermittent basis and substation transformers on a three-phase continuous basis, special consideration must be given to the size of the substation transformer taking into account the load diversity.

Load Balancing

At one time it was considered advisable in some cases to try and obtain a more balanced loading by installing a three- to one-phase transformer. On consideration of the fact, however, that the loading conditions were split in the ratio 1 : 2 : 1 between the phases, and the p.f. varied between them, this practice has been largely discontinued.

Other methods, however, include the provision of a motor-driven alternator giving a single-phase output from a three-phase supply, and static balancers which involve the use of reactors and condensers suitably connected between the two phases to which the welding machine is connected and the remaining phase. This arrangement gives a phase balance which is fairly good at a given loading condition. More recently, developments have been made using a special three-winding transformer in the welding machine and using the ignitrons to give a d.c. output. In all these methods the initial capital expenditure is likely to be high.

P.F. Correction

An important aspect, however, is that of power-factor. All flash-welding transformers have an inherently low p.f. which on the average is about 0·45. This can be improved by the introduction of static condensers up to 0·85 or better. It is important that the p.f. correction condenser should be installed in conjunction with the machine, so that it is only operating when the machine is drawing current, as it might in some instances draw leading current when the plant is not in use.

First Interference Report

THE Postmaster General's Advisory Committee on Wireless Interference from Ignition Systems, which was appointed to sit under the chairmanship of Sir Stanley Angwin, has now presented its report, and this has been circulated for the information of Members of Parliament. The Committee devoted its attention in the main to the abatement of interference with the television services of the B.B.C. from ignition systems, including those used in motor vehicles, motor boats, fixed or portable stationary engines, motor mowers, tractors, etc.

Recommendations

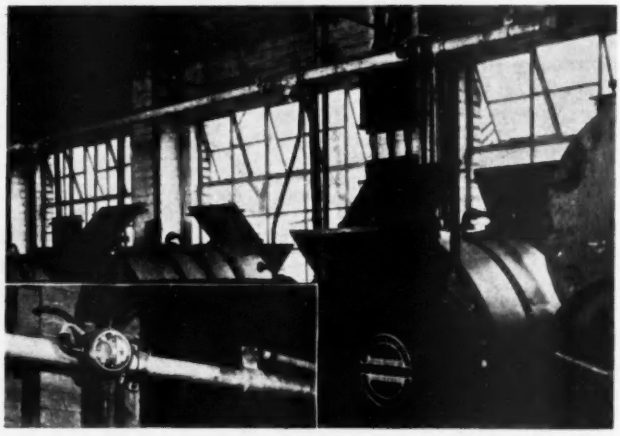
Recommendations in the report are based on the assumption that all reasonable measures will be taken to reduce the susceptibility to interference of receiving installations. They recommend that ingition equipment, when tested as installed in the vehicle or stationary engine with which it is used, should not radiate an interference-producing field which exceeds 50 microvolts per metre for frequencies in the 40-70 Mc/s frequency band, measured on specified equipment at a point not less than ten metres distant from the vehicle or engine. It is suggested that suppression to this limit can be achieved with negligible effect on the mechanical performance of the engines. In the case of about 60 per cent. of existing motor cars the Committee think that the required degree of suppression can be achieved by fitting a single resistor costing about 2s. 6d.

The Committee recommend that at least six months should elapse between the making of any regulation prescribing requirements to be complied with for the prevention of undue interference and the time of its coming into force. As regards the application of regulations to users of existing motor cars, etc., (as distinct from manufacturers) they say that the efficacy of such a measure will depend mainly upon the co-operation of the public and adequate publicity for the simple remedial measures which users can take.

Electric Heating in Chocolate Manufacture

AN interesting method of pipe heating was recently developed by the Wood Green District of the Eastern Electricity Board for the British Couverture Co., Ltd., of Nightingale Road, N.22.

The problem was presented by a pumping system recently installed to convey liquid chocolate from one part of the works to another. Various methods were suggested of keeping the pipe warm enough to prevent solidification of the chocolate, such as steam tracers or hot water jackets, but the method adopted after some experiment was the relatively simple and hygienic one of passing low voltage current through the pipe and heating it from its resistance losses.



The main pipe run. Inset is a close-up of thermostat and cable lug

The installation consists of a small transformer with a 240-volt primary designed to give continuous output of 14 volts at 230 amps, which is connected across the ends of 148 ft of 2-in. standard steam barrel. Lugs were welded on to the pipe to make satisfactory connections between the feeding v.i.r. cables and the pipe, and particular care was taken during the erection to see that all the barrel joints were cleaned before tightening, to avoid localised heating. A pipe thermostat, which controls the primary of the transformer through a one-to-one ratio transformer keeps the temperature constant. The necessity of this transformer is to obviate a supply with earthed neutral being brought into contact with the pipe run. The pipe circuit is not earthed and is insulated from its metal supports by means of leather cushions between the pipe and the saddles. An additional precaution is an earthed screen between the primary and secondary windings of the transformer.

The installation is designed to heat from room temperature to 110° F. in 30 minutes. A time switch is therefore arranged to make the heating circuit half an hour before the works open each morning.

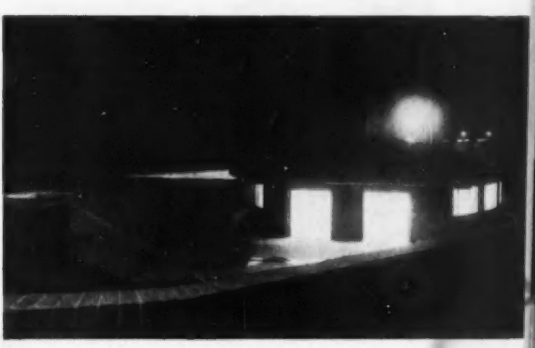
LIGHTING THE TYNE TUNNEL

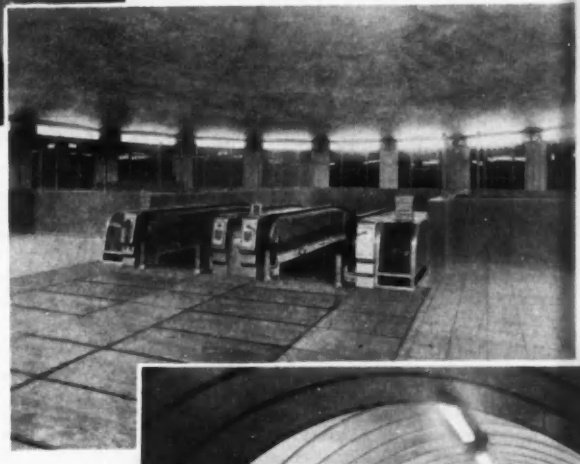
IN the new pedestrian-cum-cyclist tunnels under the Tyne which the Minister of Transport opened on July 24 particular attention has been paid to the lighting so that the intensity falls gradually from the tunnel entrance. Illumination intensities of 18-20 lumens/sq ft at the escalators, 10-12 at the tunnel entries and lift passages and 4-6 in the tunnels themselves are obtained by using three, two, or one fluorescent tubes in the same type of fitting manufactured by the General Electric Co. Ltd. and using Osram "Intermediate" cold-cathode tubes.

In the circular entrance buildings a planned intensity of 30-35 l/sq ft (which can be switched half off to reduce the contrast with external conditions) is obtained by a visually continuous line of fittings mounted in the space between the tops of the windows and the springing of the domed roof. These are, in effect, four tube fittings, since each contains two 12 ft tubes bent into hairpin shapes. In all, 245 fittings are used.

The entrance building forecourts are lighted by 250 W mercury lamps in G.E.C. Diffracter lanterns on 25 ft "Broadcrete" columns, four being used at Jarrow and five at Howden. The whole system forms an example of the application of modern light sources in a pleasing and simple manner to a utilitarian scheme.

Consulting engineers were Messrs. Sloan and Lloyd Barnes of Liverpool, in conjunction with Messrs. Mott, Hay and Anderson of Westminster. Erection and h.v. wiring of the cold-cathode fittings was carried out by the G.E.C. and their associates Claude-General Neon Lights Ltd. Low voltage wiring and general contracting was by Campbell and Isherwood Ltd.





Illustrations show, top to bottom, the exterior of the Jarrow entrance building; two-tube fittings in cyclists tunnel; interior of Jarrow entrance building; and the foot of the escalators at Jarrow. In the top picture, the lights of the Howden end can be seen in the background

overseas news

Oliphant on Atomic Power

Nuclear generation of electricity would already be an economical proposition in Australia, declared Professor M. E. Oliphant when lecturing at Sydney University a few days ago. In Australia, coal mining and fuel transport difficulties had been so great and had existed so long that clearly they were not ephemeral difficulties. Men were reluctant to go down coal mines when other work was available, and because of coal shortages, there was increasing resort to diesel generators, using imported fuel. Therefore it was worth considering using atomic energy for generation of electric power. One pound of uranium could produce energy equivalent to that of 1,500 tons of good coal burned in a good power station. One of the most difficult problems to solve in producing atomic power on a large scale was disposal of poisonous and radio-active products, and finding sites for power stations outside large towns, he said. This problem was easily avoidable in Australia. By using atomic energy power stations outside cities, coal dust, ash disposal systems and smoke from chimneys would disappear for all time, he prophesied. Admitting that many technological problems had to be solved before atomic industrial power could be produced with complete reliability, high efficiency and safety, he considered them not insuperable, although many experimental power stations might have to be built before good results could be guaranteed. Professor Oliphant also suggested that Australia should construct a solar radiation power station. Its capital cost might be £40 million, but it would pay for itself in about twelve years, he estimates.

Nymboida Scheme

Clarence River County Council, New South Wales, has approved a recommendation that investigations should go ahead for a hydro-electric project on the Upper Nymboida, This project envisages the construction of three power stations. It was stated that an international firm had indicated its readiness to undertake the design and construction of the scheme, and import labour and materials to complete the project quickly. The Council adopted a recommendation by the chief engineer, Mr. R. S. Rice, that an order be placed with a local concern for an aerial survey costing £4,455.

The Appliance Market

Although Canada is generally regarded as highly electrically developed, Mr. C. A. Winder, general sales manger of Moffats Ltd., has given some information on outlets for future sales. At January 1, 1951, he says, there were 1,807,200 homes in Canada which were wired for electricity, but which did not contain an electric refrigerator. This total represents 58·5% of the wired homes in Canada. He also estimates that of the 1,282,099 refrigerators in service, at least 50% are of pre-war manufacture. Putting the average life of an electric refrigerator unit at 12 years, obviously a large number will soon need replacing, apart from other considerations such as improved designs. During 1950, Canadian firms produced 353,188 refrigerators. The electric cooker field he considers even brighter, for here the market is only 26·1% saturated. Local production last year was 151,615 cookers—at that rate it would take 15 years to saturate the market, not allowing for replacement of worn-out and obsolete equipment.

Plant for Windsor

Returning to Canada from a month's trip to Britain and the Continent, Mr. R. H. Saunders, chairman of the Hydro-Electric Power Commission of Ontario, revealed that a proposal to install a fourth 60 MW English Electric generator for the Windsor steam plant was under consideration. The company had offered to deliver the unit in 1953 if ordered now. Superintendent at Windsor is Mr. E. D. Holdup, formerly of Kingston-on-Thames, it will be recalled. The first 60 MW set for Windsor left Liverpool some days ago, and is to be installed and operating by October next.

Asswan Dam

The Egyptian Cabinet has approved the opening of a credit of £24 million for the estimated cost of electrification in connection with the Asswan Dam scheme and the construction of fertiliser and steel plants.

Sicilian Railways

The first section of the electrified main railways in Sicily, is now in operation. It is the Messina-Barcelona-Costrareale section, 45 km long, of the Messina to Palermo line. At present all routes on the island's 1,354 route miles of line are single track, but work has started on doubling the line on one section. The second step in the scheme of electrification of the Sicilian railway envisages the conversion of the Messina-Siracuse main line, 114 route miles. But power supply is a big problem, and until connection is made with the mainland grid, the thermal station just completed at Messina must meet the load. A similar station is under construction at Palermo, while a hydro-electric project is being constructed on the river Troina. Approval was only recently given to the plan for the erection of

cables to connect up with the mainland grid. Overhead lines having a span of 11,480 ft, suspended from steel towers 721 ft high, each on the Calabrian and Sicilian coast, will provide the connection between the two systems, bridging the Messina Straits. At their lowest point the cables will be 70 ft above sea level. To prevent the cables from touching each other in high winds the distance between them will be 72 ft. The cost of this transmission project is now estimated at just under £2,000,000.

Calcutta Electrification

Considerable progress has been made with the North Calcutta electrification scheme and it is expected that Ranaghat by August, Santipur by November and Krishnagore by December this year will get their supplies of energy from that source. The 11 kV line from Santipore to Fulia, where a new township is springing up, has already been completed and another 11 kV line from Santipore to Kaina on the other side of the Bhagirathi is scheduled to be completed by the end of this year. Under this scheme, which will cover about 1,000 square miles, a bulk supply will be taken from the Calcutta Electric Supply Corporation. The diesel plants which already operate in certain of the townlets are to be transferred elsewhere.

Duty on Transformers

Answering a questionnaire circulated by the Indian Tariff Board concerning the advisability of providing additional protection for the local transformer manufacturing industry, the Federation of Electricity Supply Undertakings in India has recommended that no increase be made to the existing import duty, and, while agreeing that the indigenous industry deserves encouragement, the Federation stresses the need to ensure accuracy and quality, presumably through the agency of the Indian Standards Institution. For, until the local transformer industry is able to guarantee performance and delivery comparable with overseas manufacturers, a rise in the protective duty on transformers would probably amount to an increase in the cost of electricity supply, which is to be deprecated, they state.

Kelvin Station

The new generating station to be erected to the north-east of Johannesburg, to which we referred on July 26, is to be called the "Kelvin" power station, after Lord Kelvin, the general manager of the City Electricity Department, Mr. J. C. Fraser, stated at the Council meeting a few days ago. The city's oldest power station is in Jeppe Street. The second station, Orlando is being expanded to look after Johannesburg's electricity needs until 1956. Then Kelvin is due to come into operation in 1957. At the outset £7 million is to be spent on it. "This might be all that is necessary," said Mr. Fraser. "But if the city continues to grow beyond the rate we now think likely, then we can expand Kelvin to the size of Orlando. And then I think we shall probably be safe for all time," he added.

Salisbury's Plan

A new electricity supply scheme to cost several million pounds has been planned by Salisbury Municipal Electricity Department, Southern Rhodesia, and the City Council's consulting engineers. The Public Works Committee has advised the Council to appoint a deputation to interview the Treasury in connection with it. The deputation would put forward the Council's proposals for enlarging its electricity undertakings and would state the financial implications of the report on the new scheme made by the city electrical engineer and the Council's consulting engineers. Earlier the responsible Minister is to be asked for his consent, in terms of the Electricity Supply Act, 1940, to the proposed extension of generating plant.

Kariba or Kafue ?

Further light on the Kariba or Kafue Gorge power scheme issue, referred to last week, has been put forward by Mr. A. B. Cowen, chairman of the Inter-Territorial Hydro-Electric Power Commission. He states that the Commission was in possession of all known facts on the two projects, and both the Commission and its advisory panel of consulting engineers agreed that Kariba should be developed first. Whichever of the several alternative methods of developing Kafue were ultimately developed, the fact remained that the river does not carry sufficient water to constitute an initial economic development to serve both territories. Therefore, if Kafue were developed first, the large Kariba scheme would have to be begun before the completion of Kafue, with obviously adverse economic results. It was claimed that Kafue power would cost 0·25d. per unit initially compared with 0·336d. for Kariba. The Commission's report, however, gave 0·2525d. as the initial Kariba cost, and the final as 0·1703d. and not 0·189d.—the costs for power delivered at the receiving stations in both territories, he said.

Fuel Inquiry

In view of the serious fuel situation, the South African Minister of Economic Affairs, Mr. Louw, has appointed a departmental committee to inquire into the recent coal shortage and the general position in regard to coal supplies.

Shasta Dam Inaugurated

Shasta Dam, the major structure in California's Central Valley project, was officially inaugurated by President Truman last weekend—it has been in operation for some months. This dam has formed an artificial lake with a surface area of 47 sq miles. Plant installed in the power house comprises five generators, each of 75,000 kW capacity, making the station the largest hydro-electric plant in the State.

PERSONALITIES

IN THE INDUSTRY

Station superintendent at Stuart Street, Manchester, generating station since 1948, **Mr. J. Whitfield,** A.M.C.T., A.M.I.E.E., A.M.I.Mech.E., has been promoted to generation engineer (operation) in charge of No. 3 sub-division of the North Western Division, B.E.A. in succession to Mr. O. S. Woods who has joined the East Midlands Division. Educated at Southampton University College, and Manchester College of Technology, Mr. Whitfield served five years indentured apprenticeship with Harland and Wolff Ltd., before taking up, in 1928, his first appointment, as technical assistant in Pirelli's 132 kV oil-filled cable laboratory. The following year he joined the Manchester Corporation Electricity Dept., serving in various capacities at Stuart Street and Barton power stations and the city stations. Mr. Whitfield's new appointment is with effect from the beginning of this month.

Mr. J. Whitfield

A well-known figure in the electrical industry, **Mr. William Brown,** recently resigned the managing directorship of the Metropolitan Electric Cable and Construction Co. Ltd., but for the time being at least, he is remaining on the Board of the company as an ordinary director. He was one of the founders of the company and had been managing director since its incorporation in 1926. Upon his retirement from executive duties he was presented by his fellow directors with a silver tray and tea service, and by the employees of the company with a silver cigarette box suitably inscribed.

The Hydro-Electric Commissioner of Tasmania, **Mr. A. W. Knight,** M.E., B.Sc., B.Com., M.I.E.Aust., has been reappointed to that post for a further five years as from July 1, 1951. Mr. Knight was first appointed as Commissioner in June, 1946, in succession to Mr. W. E. Maclean. The two present Associate Commissioners, Messrs. **W. H. Nicol** and **L. A. Johnstone,** were also reappointed for a further term of twelve months.

Mr. F. N. Prangnell, who has recently been in this country on leave and to take a refresher course at the Reyrolle's Hebburn works, has now returned to his headquarters at 12 Mission Row, Calcutta, where he is taking over representation for A. Reyrolle and Co., Ltd., for India, Pakistan, Burma and Ceylon.

Previously deputy chief accountant (finance) to the B.E.A., **Mr. Ernest Long,** F.S.A.A., F.I.M.T.A., F.C.I.S., has been nominated secretary of the Authority in succession to Mr. H. F. Carpenter, who is shortly retiring. Apart from short spells of war service (1917-19) and of commercial and tutorial experience, Mr. Long's career has been devoted to public financial administration, starting initially at Carlisle, then at Croydon, Coventry, Luton, Finchley and Newcastle - upon - Tyne, until becoming secretary of the Institute of Municipal Treasurers and Accountants in 1944. He served in that capacity for four years before joining the B.E.A. as one of the deputy chief accountants.

Mr. E. Long

Mr. J. Pease has been appointed technical sales manager of Guy Motors, Ltd., and its subsidiary the Sunbeam Trolley Bus Co., Ltd. He will be attached to the London office from September 1.

Just appointed chief generation engineer, (operation) of the London Division of the B.E.A. is **Mr. W. Wilde,** B.Sc.(Eng.), A.M.I.E.E., A.M.I.Mech.E., M.Inst.F., who has been Group II generation engineer (operation) in that Division. He succeeds **Mr. H. J. Bennett,** A.M.I.E.E., who, as we have announced, has been nominated controller of the South Wales Division. Mr. Wilde studied at Sheffield and London Universities and after practical training with the Sheffield Corporation Electricity Department, occupied various engineering positions at Neepsend and Blackburn Meadows power stations. Later he spent a period with the Newcastle-on-Tyne Electricity Supply Co. before joining the Lancaster Corporation as a charge engineer. In 1926 he came to London and took up the appointment of combustion engineer at Deptford East power station, where he held various posts and ultimately became station superintendent. With the establishment of the B.E.A. he became generation engineer (operation) of Group II of the Division's power stations.

Mr. W. Wilde

Mr. R. E. Cornish, A.M.I.E.E., senior assistant engineer in the System Operation Branch of the Chief Engineers' Dept. of the B.E.A., has been appointed system operation engineer of the Midlands Division of the Authority. Educated at Ipswich and receiving practical training with that town's electricity undertaking, he joined the London Power Co. in 1929 as assistant control room operator at Deptford West power station, and two years later became control engineer to the Croydon Corporation undertaking. He joined the Central Electricity Board in 1933, as assistant control engineer of the South East and East England District, subsequently becoming senior control engineer of that District. In 1946 he was appointed national control engineer of the Board and continued in that capacity when the B.E.A. took over. Then in 1948 he was transferred to the Chief Engineer's Department of the Authority as senior assistant engineer in the System Operation Branch.

An additional member of the Iron and Steel Consumers' Council is **Sir Harry Railing,** chairman and joint managing director of the General Electric Co., Ltd.

We understand that **Mr. H. G. Bailey,** A.M.I.E.E., resigned from his position as deputy district manager, Woking district of the South Eastern Electricity Board on July 24, after 20 years' service. Before leaving he was the recipient of several presents, including a silver salver, two clocks and a wrist watch, presented by his colleagues.

Latterly with the South Eastern Division of the B.E.A., **Mr. T. C. Ridings,** A.M.I.Mech.E., has been appointed power station superintendent at Whitehall Road station, Leeds, in the Yorkshire Division of the B.E.A. He takes up duties next Monday, succeeding **Mr. W. Walker** who retired recently.

Two new appointments among their technical staff have just been announced by United Ebonite and Lorival Ltd. **Mr. G. F. Sly,** formerly chief designer, has been promoted to the position of assistant to the works manager, Mr. F. E. Lowe, while **Mr. J. Kirkpatrick,** formerly Mr. Sly's assistant, has been appointed chief designer in his stead.

Mr. G. F. Sly

Mr. J. Kirkpatrick

Formerly with British Moulded Plastics, Ltd., **Mr. B. E. Terry,** A.M.I.Mech.E., A.M.I.P.E., has joined the Plastics Division of E. K. Cole, Ltd. at Southend as technical manager, in which capacity he will control all the technical sections of the Division. This is a newly created post, to co-ordinate the technical work. After early training and experience with British Xylonite Co., Ltd., and the L.N.E.R., Mr. Terry became toolroom foreman at the M.O.S. Shell Factory, Dukinfield. After this he was engaged for a time on the design of security equipment and machine tools in a War Office experimental station before joining British Moulded Plastics, Ltd. He has been with B.M.P. for the last eight years, as head of Development Division.

Mr. B. E. Terry

Bakelite Ltd. announce that **Sir James Swinburne,** F.R.S., who was chairman of the company from its inception until 1948, has resigned his directorship. Sir James began his work on the development of phenolic plastics in 1904 when he formed the Fireproof Celluloid Syndicate Ltd., which in 1910 was changed to the Damard Lacquer Co. Ltd., this company being one of the three firms which were later merged to form Bakelite Ltd. In recognition of Sir James's long and valued services he has been appointed Honorary President to the company. To fill the vacancy on the Board thus caused, and other vacancies which were created at an extraordinary general meeting, the following have been appointed to the Board: **Mr. P. Huffman, Mr. N. H. Docker, Mr. C. C. Last,** and **Mr. G. W. Hodds.** The last two named were appointed joint general managers.

Among the 15 new Fellows of the Institution of Works Managers for the year 1950-51 are **Mr. S. R. Eade,** M.I.E.E., manager of lamp factories of the British Thomson-Houston Co., Ltd.; **Mr. E. C. R. Gant,** general manager, Osram-G.E.C. Ltd. at Hammersmith; **Mr. P. Grove,** director of Tube Investments Ltd.; **Mr. A. W. C. McArthur,** M.I.E.E., director and works manager of W. T. Henleys Telegraph Works Co., Ltd.; **Mr. C. W. Mustill,** M.B.E., M.I.Mech.E., M.I.Prod.E., works director of Jackson Boilers Ltd.; and **Mr. W. Robinson,** works manager of Ferranti Ltd.

Mr. D. J. P. Bruderer has been appointed a director of T. Clarke and Co., Ltd.

OBITUARY

Mr. W. C. Gould, director and secretary of Southern Areas Electric Corporation Ltd., died on July 30.

E.R.A. Reports

Recent Published Information Covers Switchgear Nozzle Design, Energy Dissipation and Agricultural Applications

FURTHER reports, made generally available by the Electrical Research Association, have recently come to hand. Of these, two are concerned with fundamental research mainly in connection with switchgear design; and one deals with the application of electricity to agriculture.

Taking the switchgear reports, the first, entitled "Gas-Blast Circuit-Breakers—Aerodynamic Conditions in Nozzle as affected by Arcing and Nozzle Diameter" by A. M. Cassie and A. A. Hudson, contains further investigations into the aerodynamic conditions during arcing in the nozzle of a gas-blast circuit-breaker. In this series of tests, the influence of the arc upon the mass of air flowing through the nozzle has been examined for a range of currents from 1,500 to 7,500 amp r.m.s. with nozzle diameters from 1·0 to 2·5 cm.

It has not been found possible to make exact determinations of mass flow owing to the unknown amount of heat transmitted to the air in the arcing chamber from the portion of the arc there. Consequently it is only possible to give values of apparent mass flow.

For the above ranges of current and nozzle diameter, the ratio of apparent mass flow during the whole arcing period to the mass flow during the same period with no arc present is a function of $I/d^{1\cdot4}$.

Comparison of these mass-flow results with critical clearing pressure curves suggests the existence of a critical value of mass flow below which arc extinction becomes impossible.

A variation of apparent mass flow, greater than can be accounted for by errors of measurement, has been found in repeat tests. As yet the main cause of this is not known.

The second switchgear paper, "The Maximum Energy Dissipated During First Current Loops of Different Asymmetry on Closing an a.c. Series Circuit," by H. Goldenberg, contains a mathematical analysis of the problem. The maximum energy for all asymmetries and any value of fixed inductance is shown to be 48% greater than that of the corresponding symmetrical case, and to occur when the ratio of resistance to inductive reactance is in the neighbourhood of 0·5.

The maximum instantaneous power in the dissipating resistance for any value of fixed inductance and for all asymmetries is found to be 24% greater than that of the corresponding symmetrical case, and to occur when the ratio of resistance to inductive reactance is in the neighbourhood of 0·64.

Agricultural Application

Turning to the more general paper, Mr. A. E. Canham deals with "Electrode Soil Sterilising." This work developed from some experiments carried out by Mr. T. Robinson, a Midlands grower, who produced for his own use a harrow-type grid of rod electrodes which was supplied with current at a low voltage from a soil-warming transformer. The perfection of this method opens wide possibilities for sterilising border soil without the expense of moving it, and has the additional advantage of improving the load factor of soil warming transformers.

Before, however, this system could be turned to practical use, it was thought advisable to carry out some tests to determine basic information on the flow of current through soils, and also on the effects of moisture content and other physical factors of the soil.

It had been found that when voltages varying from 326 down to 72 volts were applied between a 6 in. dia. sphere electrode and a distant, low-resistance earth, after switching on, the resistance began to decrease with a corresponding increase in current. This continued for a certain time, after which the resistance suddenly increased considerably and the current fell to a low value. This phenomenon also occurred with the two $\frac{1}{4}$ in. dia. m.s. rods used in the preliminary experiments. The time for the change of resistance to take place from the time of switching on is known as the "time to failure." Work was also carried out to find the effects of compacting the soil and of alteration of water content. Further work was done using magnesium sulphate as an electrolyte and it was found that the addition of up to 0·05% of $MgSo_4$ had a considerable effect but the addition of further quantities had little extra effect.

It was concluded that the sterilisation of tomato-bed soil *in situ* was a practical possibility but that further work was necessary for light loams. Further general work on electrode systems was also regarded as necessary.

The BUYER'S *Column*

Alternatives to Nickel Plating

A LARGE number of manufacturers in the wireless, electrical and electronics industry have for many years used the various modern finishes of METAL PROCESSES LTD. This firm specialises in metal finishes which can be imparted without the use of precious and semi-precious metals, or by the use of an electric current. These finishes are the result of many years of research and experience, and in these days when nearly all plating, except for armaments, has been officially banned, people are turning to them as an effective alternative.

In the wireless industry many firms are using three different finishes all developed by Metal Processes Ltd. Mark II black may be used for the chassis and steel parts, whilst the "Niklit" (imitation nickel plating) finish, S.G. (steel grey) or "Blass" (black on brass) process may be applied to all brass parts. These processes are by simple immersion in mild steel tanks and can be carried out by unskilled labour. Small parts, such as, for instance, brass soldering tags, may be immersed safely 5-6,000 at a time in baskets without shaking. Sound or TV aerials can be treated with "Niklit" as well.

Owing to the prohibition of nickel plating and the acute shortage of cadmium and chrome, the application of "Niklit," "Blass" and S.G. in the electrical industries is impressive.

"Blazic" finishes are often employed on zinc or mazak based die castings. Whilst "Blazal" 2A, an aluminium and aluminium alloy, provides an excellent paint base. Manufacturers interested in these processes should send samples to Head Office of Metal Processes Ltd., Kingsbury Road, Erdington, Birmingham 24.

Autumn Heating by the "Deren"

AVAILABLE on the home market in September will be a new range of convector heaters produced by DE RENZI HOLMES AND CO., LTD., Fox's Lane, Wolverhampton.

They are constructed from sheet steel, stove enamelled in various attractive colour schemes, although standard colours are bronze, cream and ripple black.

Heating elements of nickel chromium wires wound on pure mica are enclosed in heavy machined cast-iron clamping plates. Black heat passes via an internal cowl through a chromium plated grill so that the case itself remains cool. With a built-in thermostat fitting, air temperatures between 50° F. and 70° F. can be easily maintained.

Guaranteed for twelve months the convectors are priced as follows: 1 kW, £6 2s. (P. Tax is £4 9s. 8d.); 2 kW, £9 7s. 6d. (P. Tax is £6 17s. 10d.) and 3 kW, £13 13s. (P. Tax is £10 0s. 7d.). Built-in thermostats are supplied at £1 3s. 6d. extra. Voltage ranges are: 100/110 V, 200/220 V. and 230/250 V.

Moving Buses the Bagnall Way

TO overcome the problem of moving "dead" buses and chasses at London Transport's Aldenham, Elstree works, which the executive has organised as a repair and refitting depot for all buses purchased since the war, LANSING BAGNALL LTD., Kingsclere Road, Basingstoke, Hants, have specially adapted one of their model "P" electric trucks. Designated the "P.J." the truck has with its power jack a capacity of 5 tons which with a special low jack fitted to the load axle, raises the front axle and wheels 5 in. from the ground. Having a steering arc of 200° it will be seen that manœuvring these buses, whose unladen weight is

(Above) "Deren" convector fire. (Right) Moving buses the Bagnall way

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just over eight tons, from one assembly line to another, becomes a matter of extreme simplicity.

Total weight of the truck is 1,400 lb, and lifting time is 14 secs. The driving motor is a variable speed shunt interpole motor rated at 2½ h.p. 48 volts, which, powered by current from heavy duty lead acid batteries of 60 amp-hour capacity gives speeds up to 4 m.p.h. Operating controls are simple, being located in the driving handle head. Regenerative braking down to 1 m.p.h. assists the mechanical cone-type brakes which are applied direct to the worm shaft.

Driver Conduit Fittings

WELL-KNOWN for some time as the makers of the "Empire" trouser presser, W. T. DRIVER, 36 North Road, London N.7, announce that they are now in a position to supply adaptable boxes in a range of sizes together with increased range of conduit fittings in black stove enamel. These items are being made on the premises.

"Pultac" by Pyrene

AN interesting protective material for use in spray painting is now available from the PYRENE CO., LTD., Metal Finishing Division, Great West Road, Brentford.

It is "Pultac," an easy-peel material which is applied to the walls of spraying booths, etc., by brush or spray gun and can be removed at will by tearing it off, eliminating the laborious task of scraping down.

It is non-inflammable, needs no skill in application, dries ready for use in two hours, is resistant to thinners and, being water base material needing no solvent, is economical in use. Supplied in five-gallon cans or one-gallon sample cans, the price ex-works is 15s. per gallon and 16s. 6d. net.

Demonstration Standard Cell

A MINIATURE standard cell designed especially for demonstration purposes has now been produced by MUIRHEAD AND CO., LTD., Beckenham, Kent.

It has been produced for use in education establishments where it is desirable to show the internal construction so that the working of the cell may be easily understood.

A standard cadmium cell of the saturated acid type employing cadmium amalgam and mercury electrodes is used with an electrolyte of saturated cadmium sulphate solution.

In this cell is a single glass tube, the electrodes lying side by side in the base separated by a glass web. It is mounted vertically on a square base of insulating material with connections brought out to two terminals. The cell is protected from damage by a domed glass cover held in position by a nickel-plated brass clamp ring.

TRADE PUBLICATIONS

SWITCHGEAR.—M.E.M's "Switchcraft", their new catalogue, is available from the firm, Midland Electric Manufacturing Co. Ltd., Reddings Lane Tyseley, Birmingham.

SIGNS.—The "Neogram" system of interchangeable neon signs, is described in a leaflet issued by Neogram Ltd., Terminal House, London S.W.1.

LIGHTING EQUIPMENT.—A leaflet featuring general purpose and watertight handlamps is available from the Simplex Electric Co. Ltd., Oldbury, Birmingham.

DIESEL ENGINES.—Publication No. 1521, illustrates and gives specification of the National range of engines produced by the National Gas and Oil Engine Co., Ltd., Ashton-on-Lyne, Lancashire.

LAMPS AND LIGHTING.—Leaflets describing the ranges of "Comelco" fluorescent fittings, architectural fittings and tubes and "Ohmic" filament lamps, are available from The Commercial Electric Co., Ltd., 110 Sackville St. Manchester 1.

STEEL.—Hall and Pickles Ltd., Port Street, Manchester, have issued an excellently illustrated catalogue in four languages and colours which does justice to their range of first quality steel products.

ACCESSORIES.—Just published and available to the trade is the new catalogue No. 444 of Electrical Accessories supplied by the Wholesale Fittings Co., Ltd., 46-52 Commercial St., London E.1.

PRIMARY CELLS.—A new brochure on primary cells has been published by the Atlas Carbon and Battery Co., Ltd., 56 Southwark Bridge Road, London S.E.1. It surveys the lines manufactured by the company.

INSTRUMENTS.—The English Electric Co., Ltd., Stafford, have issued a new brochure on English Electric indicating instruments.

MOTORS FOR TEXTILES.—New edition of "Brook Motors in the Woollen and Worsted Industries" is now available from Brook Motors Ltd., Empress Works, Huddersfield.

TIME SWITCHES.—Venner Time Switches Ltd., New Malden, Surrey, have just published new leaflets, M.5, V.9 and TS.26, dealing with synchronous motors, "B" type time switches and type E.R. clocks for time switches.

MAGNETIC CLUTCHES.—Electro-magnetic clutches and brakes by Rapid Magnetic Machines Ltd., Lombard Street, Birmingham 12, are surveyed in a recent brochure by the company.

ALLOYS, ETC.—"Extrusions in Hiduminium," a new publication by High Duty Alloys Ltd., Slough, Buckinghamshire, is an example to every manufacturer how, with a little care in design, their catalogue becomes an attractive, colourful and long-lasting encyclopaedia on the subject which is a pleasure to read.

HEATING EQUIPMENT.—New catalogue leaflets dealing with immersion heaters: flameproof equipment, immersion heaters, etc., have been published by Duncan Low Ltd., 299 Bell Street, Glasgow C.4.

THE WEEK

COMMERCE *in news* INDUSTRY

P.T. on Electrical Appliances

AN explanatory statement concerning the purchase tax chargeable on electrically operated domestic appliances has been issued by the Commissioners of Customs and Excise. It points out that the charge of 66⅔% on these articles includes the outfit of tools and attachments which are supplied with them. When, however, the accessories are sold separately they then fall under their appropriate groups in the Tax Schedule. For instance, the extension pipes and nozzles for vacuum cleaners are chargeable at 33⅓% under Group 12a (ii), and brushes for cleaners and carpet sweepers are exempt under Group 11j. Similarly, whisks for mixing bowls, sold separately, are chargeable at 33⅓%.

Company Reorganisation

IT was announced last week that in view of the increasing load of defence contracts being undertaken by companies within the Automatic Telephone and Electric Group, it has been decided to undertake some reorganisation in order to increase the Group's potential and to facilitate the allocation of work in the most appropriate factories within the Group. As part of this reorganisation, British Insulated Callender's Cables Ltd. and the Automatic Telephone and Electric Co. have agreed to transfer the Radio Gramophone Development Co.—a wholly owned subsidiary of B.I.C.C.—to the Automatic Telephone and Electric Co.

The Radio Gramophone Development Co. will thus become a wholly owned subsidiary of the Automatic Telephone and Electric Co. and, in future, will be employed as a unit in the Automatic Telephone and Electric Co. Group principally concerned with meeting defence requirements in respect of radio and associated equipment, including sound amplifying equipment. Production of domestic television receivers will continue in accordance with the existing planned programme up to the end of 1951, but the volume thereafter will depend upon the availability of materials and components and the number of high priority defence orders coming into production at that time.

An Institution Expands

THE Institution of Works Managers has increased the number of its branches to fifteen with the formation of three new ones at Northampton, Preston and Wolverhampton. It is interesting to note that 12 of these additions have been inaugurated within the past four years, during which time the Institution's policy of establishing new branches as soon as the number of members warranted, has been amply illustrated. Most noticeable example of this is in the Midlands where the former branch of that name, blossomed into the West Midland and Leicester sections. These in turn have sponsored the Birmingham, Wolverhampton, Leicester, and Northampton branches. That at Preston has been derived from members in Manchester and on Merseyside. For the most part these new sections have resulted from informal gatherings of a few original and pioneer members.

New Prices for Steel Scrap

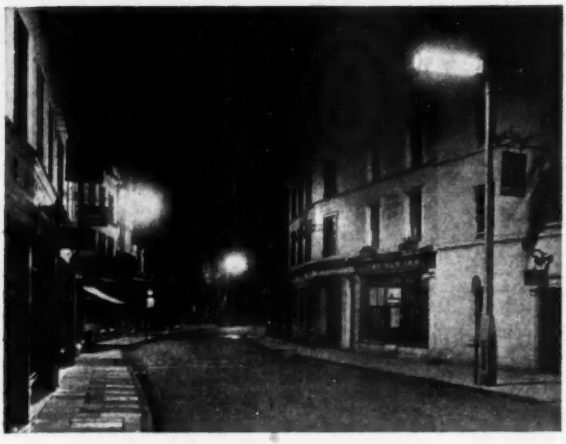
A NEW order providing maximum prices for scrap alloy steel has been made by the Minister of Supply and became effective as from August 1. It is entitled the Iron and Steel Scrap (No. 3) Order, 1951, and reimposes price control on the main specifications of alloy steel scrap. It also brings all important specifications of stainless steel scrap under statutory price control for the first time. Copies of the order are obtainable from H.M.S.O.

B.I.C.C.'s new Venture in Cornwall

NEGOTIATIONS have now been completed for the transfer of plant and equipment of Bartle's Foundry owned by South Crofty Mine Ltd. to British Insulated Callender's Cables Ltd. The freehold site and buildings have already been sold to Holman Bros. Ltd. The South Crofty Co. are the owners of a number of tin, copper, wolfram and arsenic mines in Cornwall, and making the announcement at the company's annual meeting last week the chairman said B.I.C.C. would take over as from August 31, transferring its operations to the former Redruth Foundry Co.'s premises in North St., Redruth. These arrangements would probably mean full employment for the existing employees, but possibly the most important result of the transaction would be that South Crofty could secure sufficient cash to finance the new pumping installation. Instead of having to find

The First Half-Century

The new electrical works of the British Thomson-Houston Co., Ltd., at Rugby are now so advanced that we can give our readers a brief outline of what, when completed, will be an up-to-date set of shops. If no unforeseen difficulties arise it is hoped that work will be begun on patterns in about two months' time and in the machine shop by the end of November.—*From our issue of August* 8, 1901.



A view of the new street lighting scheme installed at Trowbridge by the S.E.B. with equipment supplied by Siemens

further capital for additional machinery now required to cope with the influx of orders, all such electrical equipment would be readily available, and B.I.C.C. would be able to increase to capacity the special work Bartle's Foundry had been doing for them.

Board of Trade H.Q. Moves

HEADQUARTERS of the Board of Trade is being transferred to Horse Guards Avenue, Whitehall, S.W.1, and in future correspondence for those Divisions hitherto housed at Imperial Chemical House and Thames House (North) should be sent to the new address. The telephone number in Whitehall will be Trafalgar 8855. The Commercial Relations and Exports Department, however, will be at I.C. House, Millbank, with the exception of that department's Industries Branch, which will be at Thames House (North). At the last address also will be the Industries and Manufactures Division (Branches 1, 2b and 2c), Distribution of Industry and Regional Division, and the Statistics Division.

Twin-arc Welding

IT HAS been announced that arrangements are now in hand between the Quasi-Arc Co. Ltd., and the G.E.C. whereby the former company will be the sole concessionnaires throughout the world for the G.E.C. twin-arc metallic arc welding process. We note that this process will be demonstrated on the Quasi-Arc Stand at the Engineering, Marine and Welding Exhibition at Olympia next month when Quasi-Arc twinned electrodes will be used.

Learn about Instruments

INTELLIGENT use of instruments can greatly increase efficiency of production in a wide range of industries. Recognising this, Elliott Bros. (London) Ltd., have arranged to greatly extend the training facilities which they offer for instrument users' staffs. A special department has been established to conduct the regular training courses, which are intended for engineers who have a basic knowledge of instruments.

The courses are provided as a free service to industry, and are intended for engineers who have a basic knowledge of instruments. Both the theoretical and practical aspects of instrument maintenance and repair are covered. Each of the three-weeks courses is held at Elliott Bros. head office with a limited attendance of 15 engineers, and particulars of the scheme, and of vacancies for forthcoming courses are available on request to the Service Training Dept., Elliott Brothers (London) Ltd., Century Works, London, S.E.13.

New Lights at Trowbridge

THE Wiltshire town of Trowbridge is now able to boast a new and efficient fluorescent street lighting scheme. Three firms combined to produce the excellent results shown in our accompanying illustration. Concrete Utilities Ltd. supplied the columns, Siemens Electric Lamps and Supplies Ltd. the lanterns, lamps and accessories, and the Southern Electricity Board carried out the installation. The lanterns used were Wilton Sieray 3480, each of which was fitted with three 80 W tubular fluorescent lamps operating on an instant start circuit. In one position a specially designed wall bracket was used to carry the lantern as obstructions prevented a standard.

Power Cut Warnings

A REPORT emanating in the S.W. Scotland Area indicates that short-wave radio stations are to be inaugurated to give warnings of impending power cuts, similar to those now being brought into service in Yorkshire. We understand that four such stations are being planned—at Paisley, Greenock, Yoker and Dumbarton—and a fifth, in Glasgow, is under consideration.

Utility Power Plant

FOLLOWING the N.W. Electricity Consultative Council's recent meeting it has been suggested to the B.E.A. that "utility" power stations should be built. Government restrictions on capital and steel for power stations meant an increase in cuts not only during the winter but also in summer, the Council was told. Alarmed at the present situation and its threat to industry, members have asked the B.E.A. to take urgent steps on the matter. Should this prove unsuccessful, they propose to make a direct approach to the Chancellor of the Exchequer to ease capital restrictions on new power stations.

The Council has decided to issue an Information Bulletin periodically to make its work more widely known. In its first issue the Council draws attention to the alleged practice of some landlords who are profiteering on the resale of electricity. Evidence which has been accumulated has been forwarded to the M. of F. & P. and a clause to prevent such profiteering may be included when the Electricity Act, 1947 is amended. Despite the Chancellor's refusal to reduce tax on approved safety-type radiators, the Council is to continue its efforts to secure a higher standard of safety in electric radiators.

Holme Moss to open in October

THE new high-power television station at Holme Moss in Yorkshire is to be opened on October 12, it was announced last week. This will be the second such station to be completed by the B.B.C. since the war.

Holme Moss is expected to provide for the needs of those in the East and West Ridings of Yorkshire, parts of the N. Riding, Lancashire, Notts and Derby, and the whole of Cheshire and Flint. The vision transmitter will operate on a carrier frequency of 51·75 Mcs and the sound transmitter on 48·25 Mcs. Normally, transmissions will be relayed from London, via Sutton Coldfield and then by special coaxial cable being installed by the G.P.O.

More Large Export Orders

LARGE export orders, whether they be for dollar countries or not are always welcome items of news these days. We are, therefore, pleased to note some recent achievements of the Brush A.B.O.E. Group announced by managing director, Mr. Alan Good, last week. The first contract was for electrical equipment for 15 power stations in the Argentine, and is valued at some £500,000. It was placed by Argentina's Ministry of Industry and Commerce and includes 30 diesel engines coupled to 533 kW alternators, switchgear, Heenan and Froude water coolers, motor driven fuel oil transfer pumps and station accessories. Mr. Good also told of a $1½ million order placed by the Canadian Dept. of National Defence with the Vivian Diesel Engine Works of Vancouver, in which Brush have a controlling interest. This involves thirty-three 250 kW diesel generating sets and constitutes one of the largest orders booked in Canada by the company so far.

Power Plant for Middle East

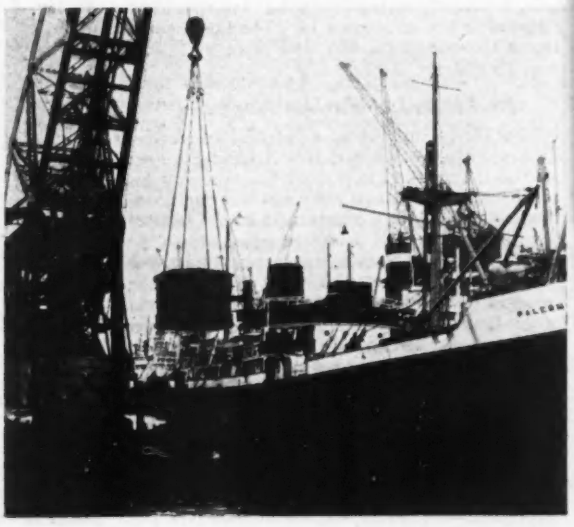
FOUR turbo-alternators totalling over 60 MW have been supplied by the G.E.C. to the Palestine Electric Corporation for the Haifa generating station. A short time ago a fifth set left this country by sea and is now being installed. This most recent addition was rated at 30 MW and with its associated 40,000 kVA 11·5/66 kV generator transformer made up a formidable cargo.

Target Figure Advocated

A SUGGESTION that Huddersfield should be given a quota or target figure, below which electricity supplies would not be reduced, was put forward at a recent meeting of the town's Chamber of Commerce. The introduction of such a scheme, it was said, might result in staggered working hours, but this was preferable to the present uncertainty as to when power cuts would take place. A similar suggestion had been made last year and turned down, but it was pointed out that Huddersfield had operated a voluntary load-spreading scheme on that basis which had proved successful. If such a guarantee was given, industries in the district could be planned within the specified limits.

India's first Coal Cleaning Plant

THE first coal cleaning plant to be installed in India has been erected at Bihar by the G.E.C. The plant operates on the Chance Sand Flotation Process, which has already become established in the U.S., S. Africa, and this country and proved so successful with the more difficult types of coal. We note also that a second plant ordered by the Tata Iron and Steel Co. for their Jamadoba Colliery is now nearing completion.



The transformer, which formed part of a large amount of equipment supplied to the Palestine Electric Corporation by the G.E.C., being loaded aboard the s.s. Palermo at Liverpool

In keeping with the holiday spirit we reproduce one of the exhibits in the colourful dressed-vehicle procession which formed part of British Insulated Callender's Cables Ltd.'s annual gala day recently. The procession which toured the town and finished at Erith sports ground opened a full programme of sport, a flower show, African dancing, concert and carnival dance, which lasted until midnight

Diesel-electric Boats for Mersey

NINE months ago the pilot vessel *Sir Thomas Brocklebank* became the first diesel-electric pilot boat to be employed on the Liverpool pilotage service which had hitherto been worked by four steamers. She was built by Philip and Son Ltd., and propelled by G.E.C. electrical machinery driven by National diesel engines. Her performance, both at her trials and since, has been so satisfactory that the Mersey Docks and Harbour Board have decided to replace another of their steam pilot boats with a similar vessel.

Golf on Merseyside

WE note that the Merseyside and N. Wales area final in the E.I.B.A. National Golf Championship is scheduled to take place at Heswall golf club on September 4. Principal trophy for this event is the Brittain Bowl, but other donated prizes will also be awarded to the runner-up, and victors in the Greensome competition. Qualifying score cards (at 2s. 6d. each) are obtainable from Mr. S. R. Gee, 29 Hope Street, Liverpool 1, and should be returned to him by August 14. The London and Home Counties final will take place at Epsom next Thursday.

Radar helps Father Neptune

FROM the equator we have heard of an unusual application of Marconi radar. Aboard the liner *Arawa*, the story runs, Father Neptune and his court had assembled to carry out the traditional "crossing the line" ceremony when a sudden rainstorm threatened to drown proceedings. By means of radar, however, it was ascertained that the rain cloud extended only 7½ miles, and the ceremony was postponed 45 minutes. At the end of this time Father Neptune reassembled his court and his prospective subjects, and the ceremony was duly carried out in bright sunny weather.

Another important use to which Marconi equipment was put recently was during the Mersey pageant which formed part of Liverpool's Festival celebrations. A parade of merchant ships and small craft and a dive-bombing attack on the port were followed by a procession of barges which let off thousands of fireworks. Such a large movement of shipping, over and above normal port activities, naturally necessitated special control, and this was achieved by the use of Marconi marine V.H.F. radio communication.

A Holiday Bonus

THE Hebburn works of A. Reyrolle and Co. closed down on Friday night when the 7,000 employees went off gaily on their annual holidays. Most workers were, however, in higher spirits than usual on these occasions for they had been given a bonus of one week's pay, up to a maximum of £6, provided they had been with the firm for one year. A notice previously circulated throughout the factory stated that the directors had decided to award the bonus in recognition of continued good work and loyalty. Similar bonuses were paid in April last year and at Christmas. The payout on the current one involves some £40,000.

Clifford Starkey (left) and Robert Burrell, both members of the engineering department of Hoover Ltd. at Perivale, seen congratulating each other after winning the Economic Co-operation Administration awards entitling them to study at an American University and in American industrial plants. Both are due to leave this month, Starkey to spend nine months studying management and Burrell a year to learn higher technology and management

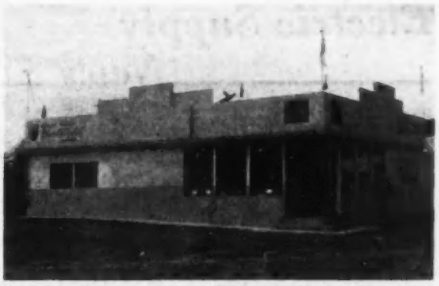
NEWS IN BRIEF

The B.E.A. has referred to arbitration the dispute concerning a wage claim for manual workers at power stations, about which there has been a stoppage of work in some areas.

The *Brunswick Wharf* built by S. P. Austin and Son Ltd. at Sunderland for the B.E.A., has been launched. She is the first of three coal-carrying vessels of the Thames up-river type on order for the Authority.

London is to be the venue for the eighth International Refrigeration Congress which is to take place between August 29 and September 11.

The B.o.T. has announced that export licence will not in future be required for, among other items, electrical laminations.



A view of the exterior of the S. Wales Electricity Board's stand at the Royal Welsh Agricultural Show held at the end of last month at Bruith. It was designed and constructed in co-operation with E.D.A.

Questions in Parliament

Capital Investment

Mr. Black asked what was the aggregate amount submitted by the B.E.A. as necessary to be spent this year on capital works to maintain services and cope with increased demand for electricity. In a written answer Mr. Noel-Baker said the Government was in close contact with the Authority and it was hoped to invest as much on capital works as possible without detriment to other essential demands. He reminded Mr. Black that no total aggregate figure had been fixed as yet for the current year.

Power Cuts in N.W.

Questioned as to what decisions were reached at his meeting with the chairman of the N.W. Consultative Council concerning power cuts in the area, the Minister of Fuel and Power stated there had been consultations between the Ministry, B.E.A., the Boards and Consultative Councils on measures by which the frequency and severity of cuts might be reduced, and he was inviting the councils to help in the work of load-spreading which was now required. He added that the meeting referred to was in January, when he met chairmen of consultative councils, members of the B.E.A. and officials of divisions and boards.

Electricity to Farms

Replying to Mr. J. Morrison, the Minister of Fuel and Power said the average time taken to deal with applications for the erection of poles to carry electricity supplies to a farm was between three and four weeks. This might be longer, however, if the local or planning authorities raised objections and demanded their right to be heard before any decision was made. He added that before permission was given to erect overhead lines he consulted the Air Ministry, Admiralty and Ministry of Works. In addition, the local planning authority must consult any interested local bodies or persons.

Battery Industry

Sir Hartley Shawcross stated in a written answer that he would consider whether or not to submit the battery industry to the Monopolies Commission when further references were selected.

Winter Load Spreading

Minister of Labour announced on Thursday the Government had accepted the recommendations of the Electricity Sub-committee on arrangements for load spreading next winter. Plans are now proceeding to enlist co-operation and effect all the arrangements. The sub-committee's report would be published this week.

Hydro-Electric Schemes

Asked what directions had been given regarding the allocation of resources to new H.E. schemes, Mr. J. Edwards, on behalf of the Chancellor, said there would be no major increase in the amount of work done each year. He presumed that the question referred to the capital investment programme of the N. of Scotland Board.

Colour Transmission

The B.B.C. was carrying out long-term investigations into the fundamental problems of colour television, but much research would have to be done before a suitable system was evolved, r. Ness Edwards stated last week. The Post Office continued to keep in touch with technical developments, both at home and abroad.

V.H.F. Broadcasting

The Postmaster-General was again pressed for amplification of his statement a fortnight ago concerning developments in v.h.f. broadcasting which, he had said, could not be divulged at present. Mr. Profumo said nobody in the B.B.C. or radio industry had the slightest idea what those developments could be, and in view of this fact would it not be better to make the facts known so that research could be speeded up. Mr. Ness Edwards said he felt he should not be pressed further as there was considerable commercial rivalry involved. A full statement would be made in the B.B.C.'s annual report. The questioner said he would raise the matter on the Adjournment.

Electric Supply News

North Scotland

The Right Hon. Hector McNeil, M.P., Secretary of State for Scotland, has confirmed a scheme prepared by the North of Scotland Hydro-Electric Board for the erection of overhead transmission lines from Boat of Garten, in Inverness-shire, to the Board's transforming station at Craigiebuckler, in Aberdeen.

The new lines will be a further extension to the grid system in the North of Scotland. The scheme is estimated to cost £698,600.

The Amenity Committee, who were consulted about the possible effects on the amenities of the districts through which the lines will pass, asked that the lines should avoid woodlands and plantable land as far as possible, and the Board have given an assurance that this will be done and that cutting will be kept to a minimum. The Board have also given an assurance that, where practicable, towers will be kept below the skyline.

Northumberland

The B.E.A. has now made formal application to the Ministry of Fuel and Power for "deemed planning permission" to erect a 275 kV grid line on 110-ft pylons from Stella, a few miles upstream from Newcastle-on-Tyne, to Carlisle along a route which for most of its length runs a mile or two south of the Roman Wall. The Northumberland County Council, as local planning authority for the greater part of the area traversed by this route, is lodging an objection and a request for a hearing; in this it has the support of the Hexham R.D.C., the amenity and open-air societies, and the National Farmers' Union. We have already reported that many protests against the scheme have been made, and an alternative southern route suggested.

Southern Board

The Southern Electricity Board have recently been informed by the Central Authority that their allocation for the current financial year will be £3,800,000, against the 1950-51 figure of £4,162,000. The amount is subject to the Government's eventual decision on the amount of the global allocation for distribution. Reviewing their programme of expenditure to keep within the limit, the Board have decided that no further cuts can be made in the amount allocated for reinforcement of the existing system, or for new points of the bulk supply, without serious risk of breakdown. After making substantial reductions on non-operational land and buildings, transport, and miscellaneous items, there remained £1,048,000 for expenditure on new business, of which £187,000 would be required to meet public needs. Accordingly, the Board have replied to the chairman of the Consultative Council that immediate steps must be taken to restrict new commitments to supplies of the highest priority. The Board regretted the need to restrict development.

Wakefield

The B.E.A. is planning the erection of a new generating station at Agbrigg on the outskirts of Wakefield. The proposed new station will occupy a 153-acre site from the Doncaster road railway bridge along the south bank of the River Calder to a point below Kirkthorpe. Plans of the proposed station have been submitted to Wakefield City Council and Wakefield Rural Council, and the City General Purposes Committee has already welcomed the proposal. It is understood, however, that concern has been expressed about the scheme mainly by residents in the Kirkthorpe and Heath areas near where the project is planned. But it has been stated that there should be no trouble from grit as it is proposed to utilise a large part of the 153 acres for depositing spoil and ash, which will then be covered with soil.

LIGHTING SCHEMES

Barnes.—New lighting is to be installed in Church Road at a cost of £651.

Coventry.—The city engineer has submitted a scheme for the conversion of street lighting from gas to electricity. Estimated cost of the first stage is £18,250.

Eye.—Consultations have been taking place between Peterborough R.D.C. and Eye Parish Council as to a street lighting scheme for the village, involving 76 street lamps and resiting of five of the existing 16 lamps.

Hornchurch.—Ministry approval has been given to the U.D.C.'s scheme for conversion from gas to electricity and improvement of certain lighting in various streets, at an estimated cost of £5,000.

Ince-in-Makerfield.—The U.D.C. has approved an estimate providing for the installation of street lighting on the Battersby Road housing site.

Isle of Man.—Electric street lighting in the Onchan district is to be controlled by the Rhythmatic system.

Neston (Cheshire).—The U.D.C. has been recommended to approve an improved street lighting scheme costing £6,437.

Northampton.—The borough engineer having reported on the cost of converting street lighting in the borough to electricity, the Highways Committee has recommended that the principle of lighting streets by electricity, should be adopted, that the conversion be effected over a period of 15 years, and that tenders be invited for the various equipment, etc. The borough engineer estimated that the total capital cost of the changeover would be £106,216, of which £13,728 would be expended in each of the first two years.

Richmond (Surrey).—T.C. to submit to M.o.T. for approval a scheme for the installation of fluorescent street lighting in Kew Road, and m.v. discharge lighting in Mortlake Road.

Surrey.—At the request of the M.o.T., the C.C. is to carry a scheme of lighting at roundabouts on the Kingston By-pass Road, at a cost of £3,000.

Company Activities

Cables Investment Trust

Gross income for the year ended June 30 last was £476,645 (*£422,844*). Administration expenses, loan interest, etc., absorbs £113,854 (*£110,183*), and tax £166,014 (*£140,155*), leaving a balance of £196,777 (*£172,506*). With £451,087 (*£379,884*) brought in there is £647,864 (*£552,390*) available. Dividends, including Ordinary total of 5%, take £98,073 (*£101,303*) leaving £549,791 (*£451,087*) carried forward.

Electrical Switchgear and Associated Manufacturers Ltd.

Consolidated profit for the year to March 31 last is £76,661 (*£69,102*), to which is added £47,570 (*nil*) profit retained by subsidiary in previous years now to be distributed. Proposed Ordinary dividend takes £121,117 (*£65,940*).

General Electric Co., Ltd.

Consolidated trading profit and investment income for the year to March 31 last increased by £1,393,020 to £7,576,559. Combined net profits, after tax, etc., was £1,978,039 (*£1,709,404*). Taxation absorbs £3,640,848 (*£2,730,690*). With £2,338,811 (*£2,031,606*) brought in and £403,234 (*£208,740*) other income, taxation and provisions no longer required, the total available is £4,720,084 (*£3,949,750*). The sum of £298,252 (*£596,194*) is transferred to general reserve, £481,372 (*£175,302*) to stock depreciation reserve and £750,000 (*£140,000*) to reserve for increased cost of plant replacement. Preference dividends take £182,200 (*£185,350*) and the Ordinary distribution of 22½% £495,933 (*£404,093*), and there is a balance carried forward of £2,512,327. Current assets are listed at £42,860,000, including stocks, etc., at £25,247,000 (*£25,450,000*) and cash £4,677,000 (*£4,103,000*). Current liabilities were £17,619,000 (*£16,697,000*). The capital reserves and revenue reserves together amount to £19,044,000 (*£17,301,000*) against an issued capital of £9,798,000.

Morgan Crucible Co.

Group profit for the year to March 31 last, after all charges but before taxation, was £1,516,976 (*£1,135,046*). The final dividend is 8½%, making 12½% for the year (*same*).

Oldham and Son, Ltd.

After all charges, except taxation, the net profit is £265,179 compared with £210,161 for the previous ten months. Taxation absorbs £154,610 (*£108,551*). The chairman, Mr. John Oldham, states that the new type of "Fibrak" separators, developed in the company's Denton laboratories, are now being fitted to an increasing variety of the firm's batteries. The separators are also to be made in America under licence. Considerable importance is attached to the firm's development of subsidiaries in France, South Africa and India. In South Africa particularly, substantial progress has been made and a net profit of £47,991 shown for the second year's working. In India, after many delays, manufacture of storage batteries has now commenced.

Radiovisor Parent Ltd.

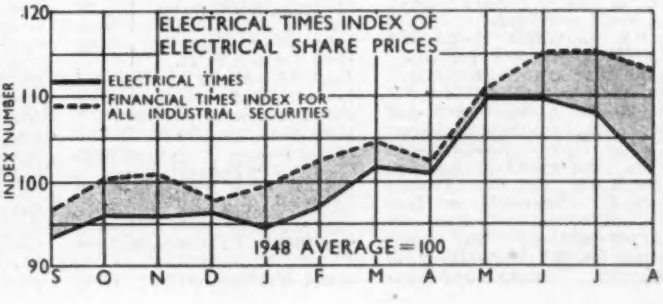
For the year to March 31 last, the trading balance is £11,279 (*£5,032*). To depreciation £1,085 (*£788*), off patents, etc., £1,000 (*£1,695*). The final dividend is 12½%, making 25% (*nil*). The sum of £6,864 (*£12,981*) is carried forward.

Thorn Electrical Industries Ltd.

The consolidated trading profit jumped to £510,123 for the year to March 31, 1951, compared with £231,738 for the previous twelve months. The Ordinary dividend is 10% on capital increased by a rights issue and 100% share bonus (against 20% on the former capital). After charging tax £210,447 (*£78,527*) the net profit is £169,514 (*£58,816*). To general reserves £80,000 (*£15,000*), future tax re initial allowances £10,000 (*same*) and employees pensions £20,000 (*nil*). The sum of £52,109 (*£37,300*) is carried forward.

Whitehall Electric Investment

The directors propose repayment of all the £937,500 6% Cumulative Preference and 10% of the £3,671,875 Ordinary capital at 25s. per £1 unit. This will absorb £1,630,860, leaving for the £3,304,687 Ordinary stock held by the S. Pearson and Son group the balance of assets valued, excluding the Athens electricity holding, at £3,713,964, equal to approximately 22s. 6d. per £1 of stock. The proposal will be considered at an extraordinary meeting on August 15.



Figures at the end of July for both electrical and all industrial shares showed a very noticeable downward trend. The decline was most remarkable in the former where the "Electrical Times" index showed a fall of 7·7 to 100·8. At the same time "Financial Times" figures for all industrial shares fell from 115·5 to 113. Figures are based on average prices ruling during 1948.

Commercial Information

CONTRACTS OPEN

HOME

Aug. 11.—Erpingham (Norfolk) R.D.C. Complete wiring of 52 houses in course of erection. Architect, Council Offices, St. Peter's Rd., Sheringham.

Aug. 13.—Southport T.C. Installation of class A sodium lighting along five roads and class B filament lighting along 30 roads. Lighting Engineer, 117-123a Shakespeare Street.

Aug. 13.—Stepney. Installation of lighting, heating and power points in 77 dwellings at Vallance Rd. Borough Engineer and Surveyor, Municipal Offices, Duval St., E.1. (See July 12 issue.)

Aug. 13.—Bradford. Electrical installation in 138 houses and 24 flats on Buttershaw estate. Engineer and Surveyor, Town Hall. Deposit £2 2s.

Aug. 13.—N. Walsham (Norfolk) U.D.C. Installation of 223 additional electric light points in houses on Millfield estate. J. A. Yates, Council Offices, New Rd., North Walsham. Deposit £1 1s.

Aug. 15.—Cumnock and Holmhead T.C. Supply and erection of lamps, lanterns, controls, wiring, etc., for 44 lighting points on trunk road A.75. Burgh Surveyor, Town Hall, Cumnock.

Aug. 17.—York. Electrical rewiring of portion of Cattle Market. City Engineer and Architect, C. J. Minter, Guildhall. Deposit £1.

Aug. 17.—Belfast. Supply and erection at Victoria power station of 3,300 V 150 MVA air or oil break switchgear, 400 V, 15 MVA air break switchgear, 400 V fuse gear and accessories. Also three centrifugal circulating water pumps, each capable of 23,000 g.p.m. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. for each specification. (See June 14 issue.)

Aug. 17.—Newcastle-on-Tyne T.C. Provision of electricity supply and o.h. line equipment. Frank S. Taylor, General Manager, Transport and Electricity Undertaking, Head Office, Manors, Newcastle 1.

Aug. 18.—Bath. Supply of electrical and other fittings for street lighting. City Engineer, Guildhall, Deposit £1 1s.

Aug. 18. — Warsop (Notts) U.D.C. Wiring for electricity of 147 houses in Fitzherbert St. area. Applications to R. J. Smith, Clerk to Council, Town Hall. Deposit £2 2s.

Aug. 20.—Surrey. Provision and erection of 51 concrete columns, 140 W sodium lamps and ancillary equipment along Kingston By-Pass (A.3). County Engineer, County Hall, Kingston.

Aug. 21.—Sunderland T.C. Electrical installation in 12 shops and flats on Pennywell estate. Borough Architect, Grange House, Stockton Rd., Sunderland. Deposit £2 2s.

Aug. 22.—Keighley T.C. Supply of 14 5-ft fluorescent fittings, 14 sets of control gear and 28 warm white lamps for Central Library and Hall. Tenders to Town Clerk, Town Hall.

Aug. 22.—Tettenhall U.D.C. Supply and erection of street lighting equipment on trunk road A.41. Installation involves tubular steel columns and full "cut-off" type lanterns and sodium lamps. J. W. Mason, Engineer and Surveyor, Council Offices. Deposit £2 2s.

Aug. 22.—Keynsham (Bristol) U.D.C. Electrical work in 37 houses on Norman Rd. estate, Saltford. Engineer and Surveyor, Council Offices, Keynsham. Deposit £2 2s.

Aug. 22.—Slough T.C. Supply and erection of 61 concrete columns, lanterns and 80 W mercury lamps in Stoke Poges Lane. Borough Engineer, Town Hall. Deposit £1 1s.

Aug. 23.—Forres. Electrical work in erection of new police station and houses for Scottish N.E. Counties Police Board. John Frindlay, county architect, County Buildings, Elgin.

Aug. 24.—Fife. Electrical installation in each of following schools: Carleton primary, Glenrothes, Camdean primary, Rosyth, Valley primary, Kirkcaldy, Blacklaw primary, Dunfermline, Comrie junior secondary, Oakley, Surveyors, Messrs. James Gentles and Son, Central Chambers, High St. Kirkcaldy.

Aug. 25.—Dundee. Supply of standards, brackets and lamps and lanterns for street lighting. Public Lighting Engineer, 46 Dans Rd., Dundee.

Aug. 27.—Lees U.D.C. Supply and erection of 21 concrete columns and supply of 21 lanterns with 140 W sodium lamps along a section of Huddersfield Rd. Supply and erection of 34 concrete columns and provision of 34 lanterns and 150 W tungsten lamps along Stamford Rd. and St. John St. Also provision and erection of 28 concrete columns and supply of 28 lanterns with 150 W tungsten lamps along Spring Lane and Thomas St. Council Offices, Lees. All three are separate contracts and deposit in each case is £2 2s.

Aug. 27.—Norwich. Supply and installation of 21 concrete columns, 350 yd. of lighting main and 44 yd. of cable for street lighting in Farrow and Guardian Rds. City Engineer's Office, City Hall. Deposit £2 2s. (Advertised in this issue.)

Aug. 27.—Manchester. Installation of fire alarm system at "Newholme," West Didsbury. City Architect, Town Hall. Deposit £1 1s. (See August 2 issue.)

Aug. 27.—West Riding. Installation of electricity at Wombwell Kings Rd. school. County Architect, "Bishopgarth," Westfield Rd., Wakefield. Deposit £1 1s.

Aug. 27.—Wolverhampton T.C. Installation of sodium mercury and fluorescent lighting, including supply and erection of steel columns, lanterns, auxiliary control and time switches. Borough Engineer, Town Hall, Deposit £2 2s. (See August 2 issue.)

Aug. 28.—Bradford. Electrical installation at Reception Block in Squire Lane. City Architect, Town Hall.

Aug. 28.—Basingstoke. Electric lamps are included in list of supplies for six months beginning Oct. 1 for Park Prewett Hospital. Tenders to secretary, Frederick Hales.

Aug. 29.—Kidwelly T.C. Supply and erection of 3 centrifugal sewage pumping units rated at 50 g.p.m. and 2 rated at 25 g.p.m. All to be electrically operated and automatically controlled. Engineers, Messrs. A. P. I. Cotterall and Son, 54 Victoria St., Westminster, S.W.1. Deposit £2 2s.

Aug. 31.—Chichester. Supply and erection of 5 automatically controlled electrically driven pumping units and auxiliaries. Water Engineer's Office, Greyfriars, North St. Deposit £2 2s.

Aug. 31.—Belfast. Supply and erection of 33 kV and l.v. transformers of ratings up to 7,500 kVA. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-on-Tyne 1. Deposit £5 5s. (See July 19 issue.)

Sept. 1.—Swansea T.C. Water Dept. requires two electric battery trucks capable of carrying 15 cwt and traversing 15 miles at one charging. T. Price, Water Engineer and Manager, The Guildhall.

Sept. 3.—Manchester. Supply and installation of approx. 54,000 linear yd. of cables for operating motorised valves. Secretary, Waterworks Offices, Town Hall. Deposit £5 5s. (Advertised in this issue.)

Sept. 14.—Belfast. Supply and erection of automatic fixed-type CO_2 fire fighting installations. Merz and McLellan, consulting engineers, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (Advertised in this issue.)

Sept. 14.—Belfast. Supply and erection of ash handling plant of high pressure sluicing type capable of removing 45-50 tons per hour, for Victoria power station. Merz and McLellan, Carliol House, Newcastle-on-Tyne. Deposit £5 5s. (See August 2 issue.)

Sept. 24.—Manchester. Installation of electrically operated sluice valves included in contract N.3 for Corp. Waterworks. Secretary, Waterworks Office, Town Hall. Deposit £10.

Oct. 3.—Downpatrick T.C. Supply and installation of 9 direct driven centrifugal electrically propelled pumps for town's sewage scheme. M. J. Hayes, Town Clerk, U.D.C. Offices. Deposit £5 5s.

No date stated.—Midlothian. Electrical work in additions and alterations to Newtonloan school. County Architect, 32 Palmerston Place, Edinburgh 12.

No date stated.—N. of Scotland H.E. Board. Supply and erection of about 52 miles of 11 kV and 15 miles of l.v. wood pole overhead lines in Carmyllie District. Kennedy and Donkin, 12 Caxton St., S.W.1. Deposit £2 2s. (Advertised in this issue.)

No date stated.—Derbyshire. Conversion from steam to electric drive steam and condense services in new laundry machinery at the Grove, Shardlow. County Architect, County Hall, St. Mary's Gate, Derby. Deposit £2 2s.

OVERSEAS

*Details of items marked * may be obtained on application to Room 1076, Board of Trade, Thames House, North Millbank, S.W.1, quoting reference.*

Aug. 20.—Auckland (Z.N.). Electric Power Board invites tenders for supply of l.t. cable: 12,000 yd 2-core paper insulated and 19,500 yd of 4-core paper insulated cable. B.o.T. (Ref. CRE (IB) 66873/51).*

Aug. 20.—Auckland (N.Z.). Supply of six 450 kVA 3-phase transformers — double wound core type, self-cooled oil immersed, suitable for connection to 6,600 V system to give 415 V. Tenders to Chairman, Auckland Electric Power Board, Queen St., Auckland. B.o.T. (Ref. CRE (IB) 66874/51).*

Aug. 23.—Melbourne. Director of Posts and Telegraphs calling for tenders for supply of general electronic testing instruments. Documents available at office of High Commissioner in London.

Aug. 29.—South Africa. Manufacture, supply and testing at works of h.t. switchboard cubicles and current transformers of various specifications for City of Johannesburg. B.o.T. (Ref. CRE (IB) 66777/51).*

Sept. 4.—Egypt. Tenders issued by Ministry of Municipal and Rural Affairs for the extension of electricity network at Yanta, including supply and erection of switchgear and cables. B.o.T. (Ref. CRE (IB) 66984/51).*

Sept. 4.—India. Supply of 120 50 kVA and ten 250 kVA 11 kV/415 V, 3-phase outdoor, platform mounting. Director General of Supplies and Disposals, Shahjahan Rd., New Delhi.

Sept. 25.—Wellington (N.Z.). Manufacture and supply of a screen cleaner, including lifting gear, control gear, trailing cable, cable drum, plug, three ground sockets, etc., for Whakamaru power station. Ministry of Works, Box 8015, Govt. Bldgs. P.O., Wellington. B.o.T. (Ref. CRE (IB) 67009/51).*

Oct. 4.—Uruguay. Banco de la Republica Oriental del Uruguay requires supply of private automatic telephone exchange and accessories for their central offices. B.o.T. (Ref. CRE (IB) 66775/51).*

Your Queries — Answered

"Ultralux" lighting fittings, makers of? L.L.—Troughton & Young Ltd., Imperial Court, Basil St., S.W.3. (21039)

Replacement immersion heaters for "Hotric" water heaters, suppliers of? N.W.—George Pearson (Engineers) Ltd., 208 Chingford Mount Rd., E.4; Metway Electrical Industries Ltd., King St., Brighton. (21046)

"Marmet" kettles, makers of? E.E.—Martins Metal Industries Ltd., 121 Kingsway, W.C.2. (21057)

"Gunfire" time switch, makers of? E.B.—British, Foreign and Colonial Automatic Light Controlling Co. Ltd., 100 Holdenhurst Rd., Bournemouth. (21069)

"Onan" generator 2 kVA, 230 V, suppliers of? H.B.—Mathews Bros., 25 Sandy Lane North, Wallington, Surrey. (21072)

"Vega" washing machine, makers of? T.E.—These were made by Hunting Aviation Ltd., Caernarvon, N. Wales, which went out of business about two years ago. The Henderson Safety Tank Co. Ltd., 6 Elstree Way, Boreham Wood, have stated that they are able to undertake repairs. (21086)

"Airmax" fans, suppliers of? A.B.—Domestic Fans Ltd., 20 Upper Park Rd., N.W.3. (21093)

The above are selected from questions we have answered this week. If you have a query, send it to us.

CONTRACTS PLACED

B.E.A. One 30 MW turbo-generator set, Acton Lane "B," and one 52,500 kW turbo-generator set, feed heating and condensing plant for Brighton "B": Richardsons, Westgarth and Co. Ltd.; boiler feed pumps for Meaford "B": Mather and Platt Ltd.; generator transformers at Ince: G.E.C.; generator transformers for Roosecote: Metropolitan-Vickers Elec. Co. Ltd.; high-pressure pipe work at Braehead: Babcock and Wilcox Ltd; 75 MVA 132/33 kV transformer and earthing transformer for Bedford National Aeronautical Establishment: English Electric Co. Ltd.; 132 kV 2,500 MVA switchgear and extensions at Kirkby substation: Ferguson Pailin Ltd.; 20 MVA 132/11 kV transformers and earthing transformers at Fawley substation: G.E.C.; and 75 MVA 132/66 kV transformers and auxiliary transformers for Dunston substation: Ferranti Ltd.

Coventry. Electrical installation at proposed E.B.M. school at Whitley, B.C.S. Electrics Ltd., £2,152.

Kendal T.C. Reorganising street lighting on trunk road through the town. N.W. Electricity Board, £9,687.

Macclesfield T.C. Supply and erection of 42 sodium lamps and concrete columns, N.W. Electricity Board, £2,471.

Sheffield. Electrical installation at Jordanthorpe secondary technical school, Yorkshire Electricity Board, £12,094.

TRADE NOTES

Eire Branch. James Kilpatrick and Son Ltd., the well known Scottish electrical installation engineers and contractors, have opened offices, workshops and stores at 41 Hogan Place, Dublin, from which they will operate their activities in Eire. The branch manager is Mr. Brendan Mathews.

Change of Address. The London office of Scottish Cables Ltd. has moved to Bush House, Aldwych, W.C.2. The telephone number remains unaltered, Temple Bar 5716.

New Branch. Pope's Electric Lamp Co. Ltd. have opened new branch premises at 91 London Road, Leicester. The manager is Mr. P. G. Hackett.

PRICES OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	234 0 0	£220 0 0
LEAD, good soft pig (foreign)	183 0 0	136 0 0
,, ,, "English" quality ...	181 10 0	
TIN (99·99.75%) ... ...(Cash)	810-812	—
,, (3 months)	800-801	—
ALUMINIUM, commercial purity (del.)	124 0 0	—
ZINC	190 0 0	140 0 0
ARMOURING:		
Galv. Steel Wire (0·104 in.) ...	50 0 0	—
Mild Steel Tape (0·04 in.)	26 10 0	—

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Thermo-Cookers Ltd. Creditors of this company which is being voluntarily wound-up are asked to send particulars to the liquidator, E. C. Baillie, 23 Blomfield St., E.C.2, by Aug. 31.

Partnership Dissolved

Rhondda (Glamorgan). Tudor Allsop and Henry White, trading as "Allsop and White," electrical engineers at 28 Brithwennydd Rd., Trealaw, Rhondda. Partnership dissolved as from July 27. All debts received and paid by Henry White, who will continue business under his own name.

First Meeting

London. Ribec Battery Co., Ltd., of Glastonbury, Somerset, manufacturers and suppliers of electrical batteries. Meetings of creditors and contributories at Official Receiver's Office, 26 Baldwin St., Bristol 1, on Aug. 14 at 10.30 and 11 a.m. respectively.

BANKRUPTCY ACTS

Appointment of Trustee

Derby. Leslie R. Maisey, trading as "R. Maisey," electrical contractor, at 50 High St., Alfreton, Derbyshire, and 3 Main Rd., Jacksdale, Nottinghamshire. Trustee is Frank Walter Flint, Incorp. Acc., 5 Regent St., Nottingham.

Intended Dividends

London. Hyman Gold, radio and electrical engineer, trading as "Radio and Electric Service" at 193 Mare St., Hackney, and "Goldway Electronics" at 141 Park Rd., St. John's Wood, N.W.8. Last day for receiving proofs, Aug. 16. Trustee is A. W. Hunter, 185-188 High Holborn, W.C.1.

Wigan. John Bannister, electrical contractor, trading at 2 The Wiend, Wigan. Last day for receiving proofs, Aug. 15. Trustee is Arthur Tyldesley Eaves, 47 Mosley St. Manchester 2.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller

Egatube. 694,063. Class 20. Tubing for electric conduits, and junction fittings, made of plastics; 699,032. Class 17. Non-mouldable plastics in the form of tubes. Ega Electric Ltd., Holyhead Rd., Wednesbury, Staffs.

Heenan. B688,373. Class 11. Refuse disposal furnaces, incinerators, water, air and oil cooling installations. Heenan and Froude Ltd., Shrub Hill Rd., Worcester.

Indola. 691,315. Class 11. Ventilating fans and hot air apparatus for use in drying the hands. Indola N.V. 86, Westunde, Voorburg, South Holland.

Ionomatic. 698,171. Class 11. Water treatment apparatus and installations. Pulsometer Eng. Co. Ltd., Nine Elms Iron Works, Oxford Road, Reading.

Lewsyn. 697,920. Class 9. Insulated wire, fuse wire and resistance wire. London Electric Wire Co. and Smiths Ltd., 24 Queen Anne's Gate, S.W.1.

Minislave. 698,489. Electrical relays. Walter Instruments, Ltd. Garth Rd., Lower Morden, Surrey.

Neosid. 698,376. Class 9. Magnetic cores. Neosid Ltd., 31-33 Hyde Way, Welwyn Garden City, Herts.

Philips. 669,330. Class 9. Electric capacitors, ballasts and starting apparatus all for use with discharge lamps; photographic flash bulbs; infra-red and ultra-violet apparatus and lamps; radio transmitting and receiving apparatus, etc. Philips Electrical Ltd., Century House, Shaftesbury Avenue, W.C.2.

BUSINESS PROSPECTS

HOME

Berwick T.C. Tenders being obtained for erection of 28 houses at Spittal. Borough Surveyor is J. Armitage.

Beverley R.D.C. Construction of 30 houses on four sites. G. Palfreyman, Engineer, Surveyor and Architect, 36 Market place.

Birmingham. Work is now in hand for site preparation in respect of city's multi-type school at Sheldon. Building is expected to start by the end of the year.

Bradford. Construction of one or both of two infants' schools on Reevy Hill and in Canterbury Ave. City Architect, Town Hall.

Bridlington T.C. It is proposed to build 26 houses and 4 bungalows on West Hill estate. Tenders are also being invited for erection of 12 flats on Alma Avenue.

Cardiff. It is proposed to build 22 bungalows at Rumney.

Chichester. Negotiations are in hand for erection of 54 houses.

Clutton (Som.) R.D.C. Erection of 20 houses at Stowey Sutton. Architects are Thomas and Morgan and Partners, 23 Gelliwasted Rd., Pontypridd.

Colne Valley (Yorks) U.D.C. Plans approved for 30 dwellings at Linthwaite.

Derby. B.R. is to spend £200,000 on Midland Station improvements.

Derbyshire. A new primary school to be built at Snondon is estimated to cost £35,000.

Down. Erection of primary school at Donaghadee. Quantity Surveyor, V. B. Evans, 3 Bradbury Place, Belfast.

Dumbartonshire. Burroughs Adding Machine Ltd., 8 Lowther Terrace, Glasgow, are to build a factory on Strathleven Industrial Estate.

Durham. Contracts expected to be let shortly for electrical installation in 8 police houses in Taunton Ave., and Windermere Crescent, and also 10 houses on Merry Oaks estate. Plans by County Architect, Court Lane.

Easington R.D.C. Contracts to be let shortly for erection of 8 bungalows at Blackhall, 16 houses at Thornley and 14 at Wingate. Plans are by Borough Surveyor. The Council has approved layout plans for 108 houses at Eden Lane for Peterlee Development Corporation.

East Suffolk. Erection of junior school at Kesgrove. Applications immediately to County Architect, E. J. Symcox, County Hall, Ipswich.

Erith T.C. It is proposed to build 52 houses in Matfield Rd. Site works now in hand. Borough Engineer and Surveyor is J. H. Clayton.

Grimsby T.C. It has been proposed to convert "Farnhurst" into a home for old people at an estimated cost of £17,433.

Hartley Wintney R.D.C. Negotiations are in hand for erection of 22 houses at Hawley, 12 at Hartley Wintney, 10 at Odiham, 11 at Hook and two at Yately.

Hebburn-on-Tyne U.D.C. It is proposed to build 102 houses to re-house people involved in certain clearance areas.

Ince-in-Makerfield (Lancs), U.D.C. Construction of 40 dwellings on Battersby St. site. Engineer and Surveyor, R. Lewis, Town Hall, Ince.

Leeds.—A county primary school is to be built in the district. City Architect is at Priestley House, Quarry Hill.

Lincoln. Erection of an unspecified number of dwellings in Dixon St. and Avondale St. City Architect, Stamp End.

Merthyr Tydfil.— Plans approved for conversion from gas to electricity of various schools in the borough. Scheme is to cost in the region of £4,145.

Middlesbrough T.C. Ministry approval is being sought for the inclusion of the following schools in next year's building programme: Berwick Hills county primary, £98,560; Middle Beck county secondary, £148,920; Town Farm secondary, £113,040. E.C. architect is P. R. Middleton.

Midhurst R.D.C. Erection of 13 dwellings on South Harting site. Council's Architect, T. Greenfield, "Newstead," Midhurst, Sussex.

Midlothian. Erection of 36 houses at Kirknewton. County Architect, 32 Palmerston Place, Edinburgh 12.

Monmouth R.D.C. Erection of 20 houses at Dingestow. Council's Architect, J. H. Thraves, 63 High St., Newport, Mon.

Montgomery. Extensions at Machynl'eth grammar school are estimated to cost £22,691.

Nenagh (Eire) U.D.C. Erection of 50 houses at Knockanpierce, Nenagh. Sean T. O'Neill, Town Clerk, Town Hall.

Newcastle-on-Tyne T.C. Erection of 125 dwellings on Montagu estate. City Architect, 18 Cloth Market.

Northampton R.D.C. Erection of 40 houses on five sites. R. J. Miller, architect, 1 Cheyne Walk.

Nottingham.—A scheme has been submitted to rewire the assembly hall and classrooms of the High Pavement grammar school and equip them for fluorescent lighting. Cost of the proposal is £2,511.

Nuneaton T.C. Erection of 24 houses on Marston estate. G. Ashton, Borough Surveyor, Council House.

Padiham (Lancs) U.D.C. Council to apply for sanction to borrow £43,608 for erection of 20 bungalows on Slade Lane estate and 16 on St. Giles St. site.

Rochester T.C.—It was revealed at recent council meeting that electric light is to be installed in 212 houses on the Maidstone Rd. estate. Total estimated cost is £4,000.

Rugby T.C. Erection of 30 houses in Lawford Lane, Bilton. Borough Surveyor, "Burford House," Rugby.

Staveley U.D.C. Construction of 30 houses on Inkersall Green estate. H. Cott, Engineer and Surveyor, Council Offices, Lowgates, Staveley, nr. Chesterfield.

Stratford-on-Avon R.D.C. Tenders to be invited for erection of 41 houses at Wellesbourne.

Strood (Kent) R.D.C. Plans approved for 80 houses at St. James' Field, Grain.

Tewkesbury T.C. Plans approved for erection of 70 houses on Oldfield site.

Tiverton T.C. Approval granted for erection of 142 houses on Cowleymoor site. Also a county primary school is to be built in Elmore district at estimated cost of £18,500.

Tynemouth T.C. Architect for proposed £144,000 secondary technical school is G. H. Gray, of Camden St., N. Shields. Borough Engineer, 16 Northumberland Sq., N. Shields, will act as architect for proposed Monkhouse county primary school.

Wallsend T.C. Scheme approved for installation of electricity in 374 houses. Estimated cost is £2,895.

Walton and Weybridge U.D.C. Construction of 28 houses on Burwood Rd. estate. Engineer and Surveyor to Council, Coun-

cil Offices, Walton-on-Thames.

Wandsworth. It is proposed to erect a county secondary school at Putney Park Lane. Cost estimated at £612,000, and preliminary plans have been sanctioned.

Wednesbury T.C. Erection of 50 houses on Dangerfield Lane site. Borough Engineer, C. G. Morrish, Town Hall.

West Hartlepool T.C. Erection of 148 houses at Owton Manor. Borough Architect is A. G. Sinclair.

Westmorland. Erection of 34 houses on five sites. Architects are Middleton and Jones, 1 Queen St., Lancaster.

West Ham. Erection of 30 maisonettes in Grange Rd. area. Thomas E. North, Borough Architect and Planning Officer, 70 West Ham Lane, E.15.

West Riding. Erection of Todmorden technical school and country college and Saddleworth Delph county primary school. County Architect, "Bishopgarth," Westfield Rd., Wakefield. The C.C. recommended to approve scheme estimated to cost £16,200, for supply of electricity to and renewal of wiring at Thornton View, Clayton. Plans by County Architect.

Whickham (Durham) U.D.C. Construction of 54 houses on Whickham No. 6 site. Architects are A. H. Fennell and Co., Bridge End Chambers, Chester-le-Street.

Whitehaven T.C. Plans approved for erection of another 52 houses on Valley estate; and application is to be made for sanction to borrow £65,192 for building 50 houses on Valley No. 7 site.

Woking U.D.C. Construction of 40 houses on Elm Bridges estate. H. P. Tame, Engineer and Surveyor, Council Offices.

MEETINGS TO NOTE

TUESDAY, AUGUST 14

A.S.E.E. (S.W. London Branch).—"Carbon Brushes for Electrical Machines." C. T. Lawrence. St. George's Hall, St. George's Rd., Wimbledon. 8.15 p.m.

WEDNESDAY, AUGUST 15

FESTIVAL SHIP "CAMPANIA". Arrives Belfast and stays until Sept. 1.

A.S.E.E. (Manchester Branch).—"The Swann Diploma." W. Langley. Engineers' Club, Albert Square. 7.30 p.m.

TUESDAY, AUGUST 21

RADIO CONVENTION. Organised by British Instn. of Radio Engrs. Third part of their convention at King's College, Cambridge, until August 24.

WEDNESDAY, AUGUST 22

MODEL ENGINEER EXHIBITION at New Royal Horticultural Hall, Westminster until Sept. 1.

TUESDAY, AUGUST 28

NATIONAL RADIO AND TELEVISION EXHIBITION at Earls Court, London. Continues until Sept. 8.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London W.C.2.

John H. Bainbridge (Sales) Ltd. To carry on business of letters out on hire and financiers of the sale by hire purchase of radio, television and electrical and mechanical apparatus, etc. Cap.: £5,000. Dirs.: Florence J. Bainbridge and W. Bainbridge, J. M. Bainbridge, R. G. Sesille and J. R. Hoult.

Baker-Hughes Trucks and Engineering Ltd., 68 Victoria St., S.W.1. To acquire letters patent granted to George Bemersyde Haig and Clement Bemersyde Haig for inventions in the manufacture of trucks and apparatus and machinery; manufacturers of electrical and mechanical trucks, etc. Cap.: £100. Dirs.: L. Y. Baker and H. J. Hughes.

W. Beauchamp and Sons (Englefield Green) Ltd., Victoria St., Englefield Green, Surrey. To take over business of builders, decorators, heating, sanitary and electrical engineers carried on at Victoria St., Englefield Green, Surrey, as "W. Beauchamp and Sons." Cap.: £6,000. Dirs.: G. E. Turner and Mrs. D. B. Turner, R. Baker and W. T. Ware.

Claydon Engineering Ltd., Vicarage Lane, Steeple Claydon, Bucks. Manufacturers of and dealers in television, radio, electronic and mechanical devices, etc. Cap.: £1,000. Dirs.: C. T. Chapman and W. J. Harris.

Controlair Ltd., 6 Mandeville Rd., N.14. Designers and dealers in medical, scientific and surgical instruments and appliances, automatic controllers, measuring instruments, etc. Cap.: £100. Dirs.: Dr. B. G. B. Lucas, H. Green and Marion I. Green and T. F. Turner.

County Works Ltd., County Works, Lloyd St., Newport, Mon. Manufacturers of and dealers in electrical apparatus, appliances, equipment, etc. Cap.: £2,500. Dirs.: C. W. Buckley, R. C. Taylor, A. W. Woodburn, K. J. Fulton, J. C. Sanders and J. F. Ford.

Empire Electrical Services (Knightsbridge) Ltd., 224 Brompton Rd., S.W.3. To take over business of electrical engineers carried on at Brompton Rd., S.W., by Lionel H. O. Bourne, manufacturers of and dealers in wireless sets, valves, gramophones, etc. Cap.: £100. Dirs.: L. H. O. Bourne and Mrs. P. W. Aldcroft.

H. Erben Ltd., 1 Old Burlington St., W.1. Electrical and general engineers, including bottling, canning, refrigeration, cold storage, cooking and preserving machinery and appliance engineers, etc. Cap.: £100. Dirs.: H. G. R. Erben and R. W. Keene.

Kimbell Refrigeration Developments Ltd., 146 Grosvenor Rd., Westminster, S.W.1. Manufacturers of and dealers in refrigerators and cold storage machinery, etc. Cap.: £100. Dirs.: Gwyneth A. Kimbell, S. S. A. B. Rackowe and J. P. Scott.

Lane and Blundell (Electronics) Ltd., 41 Addison Rd., Guildford, Surrey. Research specialists in the design and manufacture of, and manufacturers of and dealers in, electronic devices for use in connection with cameras, lenses and photographic and optical processes, gramophones, wireless and television sets, cinematograph films, etc. Cap.: £1,000. Dirs.: R. G. Lane, G. G. Timmis and J. H. Blundell.

G. H. Martin (Sales and Service) Ltd., High Level Approach, Newcastle-on-Tyne 1. Motor, mechanical and general engineers, electricians, coach and carriage builders, etc. Cap.: £2,000. Dirs.: G. H. Martin and Mrs. D. Martin.

Otco (London) Ltd., 3-4 Clements Inn, W.C.2. Merchants, bankers, traders, commission agents, ship owners, electrical and mechanical engineers. Cap.: £1,000. Dirs.: to be appointed by subs. Subs.: G. E. R. Pearl and A. J. Bloch.

Projection Heating (Frome) Ltd., Monmouth House, Cork St., Frome, Somerset. Heating, structural, welding, ventilating, lighting, mechanical, electrical and general engineers, etc. Cap.: £100. Dirs.: P. A. Long and Mrs. P. D. Cattanach.

Hewittic Rectifiers

For the operation of:-

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- D.C. Trucks and Locomotives
- Cranes, Lifts, Hoists
- Electrolytic Plant
- D.C. Light and Power Networks
- D.C. Driven Machinery in Steelworks, Gasworks, Textile Works and Factories
- Magnetic Plant
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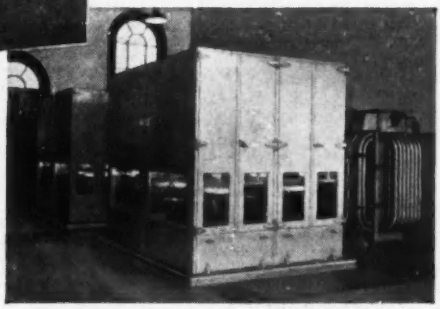
8,750 kW.—*The world's largest glass bulb rectifier, supplying D.C. to an electrolytic plant in Canada.*

35 kW.—*(Below) Hewittic rectifier operating a rubber calender, providing an extremely wide range of speed variation by means of grid control.*

HEWITTIC Rectifiers are the simplest and most reliable converting plant—backed by over 40 years of rectifier experience; robust, easily installed, occupying minimum floor-space, operating unattended (even in the largest installations), with high efficiency (down to the lowest loads) and corresponding economy in operation.



Hewittic rectifier installation supplying D.C. to motor-driven plant.

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CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WANTED · FOR SALE WORK WANTED

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia St., London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. 0d. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

CITY OF BELFAST

FIRE FIGHTING INSTALLATIONS

TENDERS are invited for the supply, delivery and erection of automatic fixed-type CO_2 fire-fighting installations.

Form of tender (No. N.1084), conditions and specification, in quadruplicate, may be obtained from Messrs. Merz and McLellan, Consulting Engineers, Carliol House, Newcastle-upon-Tyne 1, on payment of a deposit of five guineas (cheques to be made payable to the Belfast Corporation Electricity Department), which will be refunded provided a bona fide tender be lodged and not withdrawn. Extra copies of the contract documents may be obtained at three guineas per set; this sum will not be returnable.

Each tender, in quadruplicate, in sealed envelope marked "Tender for CO_2 Fire Fighting Equipment, Electricity Committee," and endorsed with the name and address of the tenderer, must reach the undersigned not later than 4 p.m. on Friday, September 14, 1951.

An official receipt must be obtained for each tender delivered by hand. Tenders sent by post should be registered.

The lowest or any tender will not necessarily be accepted.

JOHN DUNLOP,
Town Clerk.

City Hall, Belfast.
August 1, 1951. (L 592)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

South Caledonia Area

CARMYLLIE DISTRIBUTION—11 kV AND LOW VOLTAGE OVERHEAD LINES
CONTRACT No. AC/SC/4

TENDERS are invited for the supply, delivery and erection of approximately 52 miles of 11 kV and 15 miles of low-voltage wood-pole overhead lines and associated services in the Carmyllie District in the County of Angus.

Copies of the tender document may be obtained on application to the Engineers, Messrs. Kennedy and Donkin, 12 Caxton Street, London S.W.1, on and after August 10, 1951. Applications should be accompanied by a cheque for £2 2s., which will be returned on receipt of a bona fide tender.

The Board do not bind themselves to accept the lowest or any tender.

W. D. D. FENTON,
Secretary.

16 Rothesay Terrace, Edinburgh 3.
August 1, 1951. (L 594)

MANCHESTER CORPORATION WATERWORKS

CONTRACT H.V.3

THE Waterworks Committee invite tenders for the supply, delivery, laying and jointing of approx. 54,000 linear yards of electric control and supply cables for operating motorised valves on the route of the Hawes water Aqueduct now in course of construction.

Specifications, etc., together with route plans and longitudinal sections, may be obtained on application to the Secretary, Waterworks Offices, Town Hall, Manchester 2, on payment of the sum of five guineas, which sum will only be returned on receipt of a bona-fide tender and all the documents lent.

Sealed tenders, endorsed as directed and addressed to the Chairman of the Waterworks Committee, Town Hall, Manchester 2, must be delivered not later than 10 a.m. on Monday, September 3, 1951.

PHILIP B. DINGLE,
Town Clerk.

Town Hall, Manchester.
August 2, 1951. (L 597)

CITY OF NORWICH

Provision of Street Lighting

BIRMINGHAM-GREAT YARMOUTH TRUNK ROAD (A.1074), FARROW ROAD AND GUARDIAN ROAD

TENDERS are invited for the provision of street lighting on the above-mentioned roads.

The work consists of supplying and laying approximately 350 lineal yards of public lighting main; 44 linear yards of service cable; providing, erecting and putting into service 21 reinforced concrete lighting columns and ancillary works.

The general conditions of contract recommended by the Institution of Electrical Engineers and the drawings may be seen and copies of the specification, schedule of prices and particulars and tender forms obtained at the City Engineer's Office, City Hall, Norwich, on payment of a deposit of £2 2s., which sum will be returned on receipt of a bona fide tender and the return of all the documents.

Tenders, endorsed "Tender for Street Lighting, Farrow Road and Guardian Road," and sealed in envelopes to be provided, which must bear no mark or indication of the sender, shall be delivered to the undersigned not later than 10 a.m. on Monday, August 27, 1951.

The Corporation do not bind themselves to accept the lowest or any tender.

H. C. ROWLEY, M.I.C.E.,
City Engineer.

City Hall, Norwich.
July 30, 1951. (L 589)

APPOINTMENTS VACANT

BRITISH ELECTRICITY AUTHORITY

Merseyside and North Wales Division

APPLICATIONS are invited for the appointment of SECOND ASSISTANT ENGINEER (Development) in the Technical Department at Divisional Headquarters, Woolton, Liverpool. Salary, £752 to £884 per annum, being Class "AX," Grade 2, of Schedule "C" to the N.J.B. Agreement.

Applicants for the post should be Associate Members of the I.E.E. and have had experience in generating station development and associated system reinforcement problems. A knowledge of switchgear layout, system short circuit and load flow calculations is essential.

The appointment will be superannuable under the terms and conditions of the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, Clarke Gardens, Woolton, Liverpool, and should be returned to him not later than Friday, August 17, 1951.

A. R. COOPER,
Divisional Controller.
(L 579)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY NO. 514

APPLICATIONS are invited for the position of SHIFT CHARGE ENGINEER at the Greenhill generating station, Greenhill, Oldham.

The salary for this position, which is superannuable, will be £579-£609 per annum in accordance with Grade 7, Class "E" of the N.J.B. Agreement.

Candidates should preferably possess technical qualifications and previous experience in a generating station is desirable.

Applications, quoting Vacancy No., stating age, present position and giving full details of education and experience, should be received by the Divisional Secretary, British Electricity House, Wilmslow Road, East Didsbury, Manchester 20, not later than August 18, 1951. (L 571)

CORPORATION OF LONDON

APPOINTMENT OF
ELECTRICAL ENGINEERING ASSISTANT

APPLICATIONS are invited for the appointment of Assistant Electrical Engineer in the office of the City Surveyor.

Candidates should have served a full-time engineering apprenticeship and have experience in design of electrical installations for public buildings, etc., the preparation of specifications and drawings and the supervision of contracts. The possession of a Higher National Certificate in Electrical Engineering is an essential qualification and Corporate Membership of the Institute of Electrical Engineers would be considered an advantage.

The appointment is in the range of Higher Grade I, £400 by £25 to £625, commencing salary to be subject to age, experience and qualifications. The first £400 of the salary is subject to 15% and the remainder 7½% cost-of-living bonus.

The appointed officer will require to pass a medical examination and to contribute to the Corporation's Superannuation Fund as maintained under the City of London (Various Powers) Act, 1931 and 1950.

Applications, giving full personal details, particulars of qualifications, experience, age, past and present appointments, and the names of two persons to whom reference may be made, should be sent to the City Surveyor, Corporation of London, 55-61 Moorgate, London E.C.2, not later than August 27. (L 569)

CROWN AGENTS FOR THE COLONIES

ASSISTANT MECHANICAL ENGINEER required by the Zanzibar Government for one tour of 24 to 36 months in the first instance, with prospect of permanency. Salary according to qualifications and experience in the scale £655 rising to £1,005 a year. In addition a temporary allowance of 10 per cent. of salary is at present payable. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates (under 40 years) must have served an apprenticeship to mechanical engineering and have had practical experience in the operation, maintenance and overhaul of large Diesel engine generating plant, 11kV oil immersed switchgear, and auxiliary power station equipment. They should hold the National Certificate in Mechanical Engineering or equivalent and have had some experience of administration. A knowledge of Fullagar Diesel engines is desirable.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M.25313.B on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (L 561)

BRITISH ELECTRICITY AUTHORITY

North Eastern Division

APPOINTMENT OF SHIFT CHARGE ENGINEER, YORK POWER STATION

APPLICATIONS are invited for the position of Shift Charge Engineer at York power station.

Applicants should have had wide experience in the operation of generating plant and the possession of a Higher National Certificate or equivalent qualification would be an advantage.

The salary will be in accordance with the National Joint Board Schedule "A," Grade 7, Class "E" (£579-£609 per annum).

Superannuation will be in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary (Establishments), British Electricity Authority, North Eastern Division, Carliol House, Newcastle-upon-Tyne 1, to whom they should be returned to arrive not later than Tuesday, August 21, 1951. (L 572)

HIS MAJESTY'S COLONIAL SERVICE

SIERRA LEONE

A VACANCY exists for a SENIOR ELECTRICAL ENGINEER, Public Works Department, Sierra Leone, in the salary scale £1,170 to £1,300, point of entry depending upon war service and approved experience. Appointment is on three years' probation for pensionable employment. A cost-of-living allowance of £108 to £125, and an outfit allowance of £30, are also payable.

Free passages once each way each tour are granted to the officer, his wife, and up to two children up to the age of 10. Furnished quarters, if available, are provided at a low rent. Leave is granted at the rate of one week for every completed month of service in a tour of 18-24 months.

Candidates, between the ages of 30 and 40, must be A.M.I.E.E. and have held responsible posts in electricity undertakings.

They should write to the Director of Recruitment (Colonial Service), Colonial Office, Sanctuary Buildings, Great Smith Street, London, S.W.1, for further particulars and a form of application, giving brief details of age, qualifications and experience and quoting No. 27326/47. (L 542)

MIDLANDS ELECTRICITY BOARD

Wolverhampton and District Sub-Area

APPOINTMENT OF THIRD ASSISTANT ENGINEER—CANNOCK DISTRICT

APPLICATIONS are invited for the above appointment in the Cannock District of the Wolverhampton and District Sub-Area.

Applicants should have had experience in distribution work, including operation and maintenance of H.V. and L.V. underground cables, sub-stations, etc. Appropriate technical qualifications will be considered an advantage.

The conditions of service will be in accordance with N.J.B. Agreement and the salary will be Class "E," Grade 9, £519 to £525 to £531.

Applications, in writing, stating age, qualifications, experience and present salary, should be forwarded within seven days to Mr. F. J. Elliott, Manager, Midlands Electricity Board, Wolverhampton and District Sub-Area, 83 Darlington Street, Wolverhampton.

A. STEPHENS,
Secretary.

August 1, 1951. (L 586)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointments :—

JUNIOR ENGINEERS,
Cliff Quay Generating Station, Ipswich.

Salary in accordance with Clause 35 of the N.J.B. Schedule "A," Class "J," Grade 16, £413 to Grade 14, £478 per annum.

Preference will be given to applicants who have had previous experience in a Generating station and who have reached the standard of the Ordinary National Certificate in Electrical Engineering or its equivalent.

The appointments will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications stating age, experience and present position should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than August 18, 1951. Envelopes should be endorsed "Junior Engineers—Cliff Quay."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (L 540)

SOUTHERN ELECTRICITY BOARD

APPLICATIONS are invited for the following post:—SENIOR AUDIT ASSISTANT,

Chief Accountant's Department at the Head Office of the Board, Maidenhead. Salary in accordance with N.J.C. Grade 7 (£705-£795 per annum) with N.J.C. conditions of service.

Applicants must have a sound knowledge of accounting and experience of auditing and have passed the Final examination of a recognised accounting body. The successful applicant will be required to undertake responsibility for internal audit work and will be required to travel throughout the Board's area.

The successful candidate will be required to contribute to the B.E.A. and Area Boards' Superannuation Scheme if eligible.

Applications on forms obtainable from the Secretary, Southern Electricity House, Littlewick Green, Maidenhead, and returned to him not later than August 31, 1951.

F. W. KEMPTON,
Secretary.

August 9, 1951. (L 573)

CROWN AGENTS FOR THE COLONIES

DISTRIBUTION SUPERINTENDENT required by the Government of Sierra Leone for the Electricity Branch of the Public Works Department for one tour of 18 to 24 months with prospect of permanency. Salary according to qualifications and experience in scale £723 a year, rising to £1,060 a year (including expatriation pay and temporary allowance). Outfit allowance £60. Free passages. Liberal leave on full salary. Candidates, preferably not over 40 years of age, must have served an apprenticeship with a public supply undertaking and have had several years' practical experience in the installation of underground cable systems at 11 kV and 3·3 kV and 400/230 volts, and be thoroughly conversant with fault location methods. Experience with the erection and operation of overhead h.v. and l.v. lines would be an advantage. They should also have had experience in the erection and maintenance of switchgear (h.v. and l.v.) and power transformers, and be able to plan improvements to, and development of, distribution systems.

Apply at once by letter, stating age, full names in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4 Millbank, London S.W.1, quoting M.28556.B on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. (L 515)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following appointment:—

SECOND ASSISTANT ENGINEER (Efficiency and Testing) Cliff Quay Generating Station

Salary in accordance with the National Joint Board Agreement, Schedule A, Class "J," Grade 9. (£646-£674 per annum), but will be subject to negotiation.

Applicants should possess the Higher National Certificate in Mechanical and/or Electrical Engineering or other equivalent qualifications and have had previous experience in a large generating station.

The successful applicant will be required to assist in the efficient and economical operation of the Generation Plant, the preparation of statistics and the keeping of technical records.

The appointment will be superannuable in accordance with the British Electricity Authority and Area Boards' Superannuation Scheme.

Applications stating age, experience and present position should be sent to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive not later than August 18, 1951. Envelopes should be endorsed "Second Assistant Engineer (Efficiency and Testing)—Cliff Quay."

W. N. C. CLINCH,
Controller.

Northmet House,
Southgate, N.14. (L 541)

UGANDA ELECTRICITY BOARD

ACCOUNTANCY ASSISTANTS

THE Uganda Electricity Board invite applications to fill three appointments as Accountancy Assistants. Applicants should have had a sound education and experience in electricity supply organisations.

The commencing salary, to be decided according to qualifications and experience, will be within the scale £500 by £40 to £780, and a temporary allowance of 15 per cent. of salary will be payable in addition for so long as the Board may decide.

Rent-free housing accommodation (partly furnished) or an allowance in lieu, free medical and dental treatment for self and family, and free passages to and from Uganda up to the equivalent of three adult passages, will be provided. First contract will be for three years with 90 days vacation leave (or 180 days if contract is renewed) at the end thereof on full salary. Local leave may also be granted up to a total of 36 days during the period of the contract.

Provident and Pension Schemes are applicable.

Forms of application, obtainable from the Board's London Office, 129 Grand Buildings, Trafalgar Square, London W.C.2, are to be completed and addressed to the undersigned and posted so as to reach Kampala not later than one month from the date of publication of this notice.

C. R. WESTLAKE,
Chairman.

P.O. Box 559, Kampala,
Uganda, East Africa.
August 1, 1951. (L 607)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

GENERAL ASSISTANT ENGINEERS (PROTECTION)

APPLICATIONS are invited for the appointment of General Assistant Engineers (Protection) in the Divisional Technical Department.

Successful candidates will be employed as assistants to the Regional Engineers at either Nottingham, Leicester or Coventry.

The salary will be in accordance with the National Joint Board Agreement, Schedule "C," Grade 8, Class "AX/DX" (£437-£622). The commencing salary will depend upon qualifications and experience.

The appointment will be superannuable within the provisions of the British Electricity Authority and Area Boards' Superannuation Scheme.

The minimum technical qualification required is the Higher National Certificate in Electrical Engineering. Preference will be given to candidates who have completed a recognised post-graduate apprenticeship, and experience of high voltage switchgear and protective gear will be an advantage.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned not later than August 25, 1951.

L. F. JEFFREY,
Divisional Controller.

July 28, 1951. (L 568)

NORTH WESTERN ELECTRICITY BOARD

No. 6 (Lakeland) Sub-Area

APPOINTMENT OF GENERAL ASSISTANT DISTRICT COMMERCIAL ENGINEER, WHITEHAVEN DISTRICT

APPLICATIONS are invited for the appointment of General Assistant District Commercial Engineer in the Whitehaven District of the No. 6 (Lakeland) Sub-Area.

The successful applicant will be required to assist generally with the following duties:

(a) Domestic and Commercial Development Sales, including Hire and Hire Purchase transactions;
(b) Supervision of Service Centres;
(c) Publicity and Display;
(d) Organisation of Exhibitions, Lectures, Demonstrations and Film Shows;
(e) Advice on Agriculture and Horticulture supplies.

Technical training to National Certificate standard will be an advantage.

The salary for the post will be in accordance with the National Joint Board Revised Schedule, Class "D," Grade 11, i.e. £436 to £444 to £452 per annum.

Applications, stating age, qualifications and experience, present post and salary, should be received by the Sub-Area Manager, North Western Electricity Board, No. 6 (Lakeland) Sub-Area, Castle Green, Kendal, not later than Saturday, August 18, 1951. (L 578)

LONDON ELECTRICITY BOARD

TECHNICAL ASSISTANTS, DESIGN AND PLANNING BRANCH

APPLICATIONS are invited for two appointments as Technical Assistants in the Design and Planning Branch of the Northern Sub-Area at Aldersgate Street, E.C.1.

Applicants should have received a sound general technical and engineering training to Graduate I.E.E. standard. They should have had some experience in the design of modern h.v. and l.v. networks, and preferably have a knowledge of the operation, maintenance and construction of such networks, together with experience in the preparation of estimates.

The posts are graded under the National Joint Board agreement (February 17, 1950) as Class "K," Grade 10, £678 6s. 0d. per annum, rising to £707 14s. 0d. per annum, inclusive of London Area Allowance.

Application forms obtainable from Establishments Officer, 46 New Broad Street, E.C.2, to be returned, duly completed, within ten days from this date. Please enclose addressed foolscap envelope and quote Ref.: V/1291/T. on all correspondence. (L 602)

MERSEYSIDE & NORTH WALES ELECTRICITY BOARD

APPOINTMENT OF SENIOR ASSISTANT ENGINEERS

APPLICATIONS are invited for the appointment of two Senior Assistant Engineers (a) Construction; (b) Technical, at No. 1 Sub-Area Headquarters, Liverpool, at a salary of £1,075 per annum, in accordance with Grade 4, Classification "L," of the N.J.B. Agreement.

Applicants must be Chartered Electrical Engineers and have wide experience of the distribution side of electricity supply.

The duties attaching to appointment (a) will be the control of construction of mains and substations. The duties attaching to appointment (b) will be to deal with all technical subjects, including the control of the meter, protection and inspection sections.

The appointments will be superannuable and subject to medical examination.

Applications should be submitted on forms obtainable from the Manager, No. 1 Sub-Area, Merseyside and North Wales Electricity Board, 24 Hatton Garden, Liverpool 3, and returned to him not later than August 23rd, 1951.

JAMES RANKIN,
Secretary.

August 3, 1951. (L 603)

SOUTH EASTERN ELECTRICITY BOARD

Kingston and District

ASSISTANT DISTRICT ENGINEER

SALARY of £625 to £643 p.a. plus London weighting, under N.J.B. Schedule, Class "F," Grade 7. Superannuation will be arranged. Applicants should be suitably qualified and preferably Corporate Members of the I.E.E. with experience in all work of a distribution department dealing with underground single-phase and three-phase systems up to 33 kV and indoor and outdoor type substations. Experience in the detailed preparation of proposals and estimates for system extension and reinforcement is essential and knowledge of the installation commissioning and routine maintenance of protective equipment is desirable. Duties involve standby. The District includes Kingston, Surbiton, Esher, The Dittons, Walton and Weybridge.

Applications, on forms obtainable from D. C. Thomson, B.Sc., M.I.E.E., Kingston and District Manager, South Eastern Electricity Board, 22 Claremont Road, Surbiton, Surrey, to be returned by August 22, 1951.

A. L. BURNELL,
Secretary.

August, 1951. (L 604)

EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments in the Northmet Sub-Area.

91/51/R

Royston District

APPOINTMENT OF FIRST ASSISTANT DISTRICT ENGINEER (Ref. 509)

Candidates should have had a sound technical training and experience in the planning, construction, operation and maintenance of h.v. and l.v. overhead and underground systems including sub-stations.

The salary for the appointment will be in accordance with Class "B," Grade 5, of the National Joint Board Salary Agreement, commencing at £556 per annum.

Applications, stating age, education, technical qualifications and experience, with details of present appointment should be submitted to The Manager, Royston District, Eastern Electricity Board, Kneesworth Street, Royston, within fourteen days of the appearance of this advertisement.

92/51/R

St. Albans District

APPOINTMENT OF GENERAL ASSISTANT ENGINEER (Ref. No. 306)

Candidates should have had a sound training in electrical engineering and experience of the construction, operation and maintenance of 11 kV and l.v. overhead and underground distribution systems, including sub-stations.

The salary for this appointment will be in accordance with the N.J.B. Schedule, Grade 11, Class "E," commencing at £459 per annum.

Applications, stating age, education, qualifications, experience, with details of present appointment should be submitted to the District Manager, Eastern Electricity Board, St. Peters Street, St. Albans, Herts., so as to arrive not later than August 27, 1951.

Future salaries and conditions of service for both of these appointments will be in accordance with agreements made from time to time by the appropriate negotiating bodies.

The successful candidates will be required to contribute to a superannuation scheme and may be required to undergo a medical examination. (L 608)

BRITISH ELECTRICITY AUTHORITY

Yorkshire Division

APPLICATIONS are invited for the following appointments:—

(a) GENERAL ASSISTANT ENGINEER, System Operation Department, Divisional Headquarters, Leeds

Duties are of a general technical nature in connection with system operation and control. Applicants should have had a good general and technical education and preference will be given to candidates who are Graduates of the I.E.E. or hold equivalent qualifications. Power station experience will be an advantage.

(b) GENERAL ASSISTANT ENGINEERS, Technical Department

Applicants should possess the Higher National Certificate or equivalent qualifications. Some experience in the commissioning of protective equipment for electrical plant in power stations or high voltage transmission systems is desirable.

Conditions of service and salary in accordance with the National Joint Board Agreement, Grade 8, Schedule "C," £437 to £622 per annum.

The appointment will be subject to the provisions of the Authority's Superannuation Scheme.

Forms of application may be obtained from the Divisional Secretary, British Electricity Authority, British Electricity House, St. Mary's Road, Leeds 7, to whom completed forms should be returned within ten days from the date of this advertisement. Envelopes to be endorsed "General Assistant Engineer."

G. A. VOWLES,
Divisional Controller.
(L 590)

NORTH OF SCOTLAND HYDRO-ELECTRIC BOARD

FERRYHILL STEAM POWER STATION, ABERDEEN

APPLICATIONS are invited for the position of JUNIOR ENGINEER. The duties include the maintenance of generation records and statistics, with N.J.B. salary scale, Class "F," Grade 15/14.

Preference would be given to candidates of Higher National Certificate (or equivalent) standard.

Applications, giving details of experience and qualifications, should be addressed to the undersigned not later than 14 days from the appearance of this advertisement.

ALEXR. GARDNER, B.Sc., M.I.E.E.,
Area Manager.

Area Offices,
M'Ilburn Street, Aberdeen. (L 605)

COUNTY COUNCIL OF ESSEX

County Architect's Department

APPLICATIONS are invited for the appointment on the established staff of:

ASSISTANT ELECTRICAL ENGINEER, Grade IV, A.P.T.D. Salary at a rate of not exceeding £575 a year. Preference will be given to candidates holding qualifications leading to membership of the Institution of Electrical Engineers.

Candidates should be competent to design and prepare detailed plans, specifications, schedules and estimates of cost for modern electrical engineering plants, including lighting, heating and power installations, generating and distributive services.

In fixing the commencing salary, regard will be had to the experience and qualifications of the successful candidate.

Applications must be made on a form obtainable from the County Architect, Mr. H. Conolly, F.R.I.B.A., at the address stated below, and when completed, the form, accompanied by copies of not more than three recent testimonials, should be returned to him not later than August 29, 1951.

Canvassing, either directly or indirectly, is forbidden.

JOHN E. LIGHTBURN,
Clerk of the County Council.

County Hall, Chelmsford, Essex.
August 1, 1951. (L 591)

COUNTY BOROUGH OF DONCASTER

Works Department

APPLICATIONS are invited for the position of ELECTRICAL ASSISTANT in the above Department, at a salary in accordance with Grade A.P.T.V.(a) of the National Scales of Salaries (£600 rising to £660).

Candidates must have had practical experience of domestic and industrial installation work and be capable of preparing estimates and specifications and supervising the carrying out of electrical installations and maintenance work in municipal buildings, works, schools and new housing schemes.

Candidates should also have had experience of street lighting work and will be responsible, under the Borough Surveyor, for works of installation and maintenance of street lighting both electricity and gas.

Education standard should be equivalent to matriculation, and applicants should possess the Higher National Certificate in Electrical Engineering.

Written applications, stating age, education, qualifications and full details of experience, accompanied by copies of two recent testimonials, should reach the undersigned not later than August 25, 1951.

H. S. ESSENHIGH,
Town Clerk.

Town Clerk's Office,
1 Priory Place, Doncaster.
August 3, 1951 (L 603)

NATIONAL COAL BOARD

North Eastern Division

ARCHITECTURAL STAFF

APPLICATIONS are invited for the following appointments in the Chief Architect's Department of the Division at Denaby, near Doncaster.

ENGINEERING ASSISTANT (Building and Electrical) Grade 1

Salary scale £410 by £20 to £550 per annum, according to qualifications and experience.

Applicants should have drawing office experience in the preparation of layouts and schedules for the installation of power and lighting in buildings.

ENGINEERING ASSISTANT (Building, Heating and Mechanical) Grade 2

Salary scale £300 by £20 to £440 per annum, according to qualifications and experience.

Applicants should have drawing office experience in the preparation of layouts and schedules for the installation of heating, hot water, ventilation and mechanical plant in buildings.

The work of the Department covers pithead baths, canteens, medical centres, workshops, offices, laboratories, recreation buildings, etc.

Applications for the above appointments should be made on Form S.8A, obtained from the Establishments Officer, National Coal Board, North Eastern Division, Ranmoor Hall, Belgrave Road, Sheffield 10. (L 593)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

APPLICATIONS are invited from young men having an engineering degree, for the design of power transformers. Previous experience desirable, but not essential. Location Stafford.—Please write, stating age, qualifications and experience, quoting Ref. 225F to Central Personnel Services, English Electric Co., Ltd., 24/30 Gillingham Street, London S.W.1. (L 534)

CHIEF DESIGNER, to take full responsibility for designs of all types of transformers up to 10,000 kVA at 66 kV, required by modern factory in North London area.—Applicants must give full details of experience, qualifications, age, and remuneration expected. Box No. 9051, Electrical Times. (L 581)

CHIEF DRAUGHTSMAN and three Seniors with design experience of heavy duty cooking equipment required by Midland manufacturers. Initial salaries up to £850 and £650 respectively, according to experience. Five-day week; canteen; pensions scheme.—Please write with full details of past experience and degree of responsibility, in strict confidence, to the Secretary, Box No. 9045, Electrical Times. (L 574)

CIVIL Engineering Contractors in Liverpool (Kirkby) require DRAUGHTSMEN for arrangements of electrical equipment. Mechanical or electrical experience desirable but not essential. Age 18 to 30. Salary according to age and ability.—Applications, in writing, to: The Staff Officer, B.I.C.C. Ltd., Prescot, Lancs. (L 600)

DESIGN ENGINEER required by successful old-established company in the North of England, engaged particularly in the manufacture of heavy duty d.c. switchgear. He should have scientific and commercial qualifications as well as practical experience, originality and initiative. He would have unlimited opportunity for developing his ability at a good salary, rising without limit according to his performance. To the right man the future prospects are bright.—Box No. 6079, Electrical Times. (K 805)

DESIGNER-DRAUGHTSMEN, preferably with Higher National Certificate, University Degree or similar qualifications and with 2-4 years' experience are required for work on mechanical and radio engineering and also on F.H.P. motors, a.c. and d.c.—Applications, giving age and record should be sent to the Staff Manager (Ref. GBLC/714), Research Laboratories of The General Electric Co., Ltd., Wembley, Middlesex. (L 530)

DRAUGHTSMEN with experience of switchgear and/or rectifier design required by Hackbridge and Hewittic Electric Co., Ltd., Walton-on-Thames. Pension scheme, five-day week.—Write, giving past experience, technical education and salary required, to Chief Mechanical Engineer. (L 549)

DRAUGHTSMEN, with experience on all sizes of power transformers, required by company in S.W. London. Pension scheme in operation and five-day week.—State full details, past experience, technical education and salary required.—Box No. 9039, Electrical Times. (L 547)

ELECTRICAL.—Wanted by Singapore and Malayan company of engineers, single man, aged 23 to 32 years, with Grad. I.E.E. or Higher National Certificate of Electrical Engineering, preferably with experience of Diesel-operated generating stations.—For terms of service, salary, allowances and provident fund, etc., apply Box No. 9061, Electrical Times. (L 599)

ELECTRICAL AND MECHANICAL ENGINEERS AND METALLURGISTS are required for experimental work at the Research Laboratories of the General Electric Co., Ltd., East Lane, North Wembley, Middlesex. Graduate staff are needed for work on radio-communications, domestic heating appliances, illumination, light mechanical engineering problems and in the metallurgical field.—Applications, giving age and record, should be sent to the Staff Manager (Ref. GBLC/733). (L 564)

ELECTRICAL ENGINEER required, age 35 to 40. Must have high technical qualifications and be a Full Member of the Institution of Electrical Engineers. Applicants should have had at least ten years' experience in manufacturing and on the test bed, of motors, starters and switchgear.—Apply in the first instance to the Chief Engineer, The Bowater Paper Corporation Ltd., Northfleet, Kent, stating age and salary required. (L 529)

ELECTRICAL LABORATORY ASSISTANT required for development work on interesting project. Excellent opportunity in rapidly expanding company. O.N.C. an advantage but not essential.—Details, experience and salary to Mr. G. T. Atkins, Chief Electrical Engineer, British Messier Ltd., Gloucester. (L 576)

ELECTRICIAN WANTED, experienced, by Electrical Contractors in West London area.—Box No. 9057 Electrical Times. (L 584)

ENGINEER required in connection with radio, automatic telephones and clocks, at large industrial firm in Midlands. Must have good technical and practical training.—Apply, stating age, experience, and salary required to Box No. 9055, Electrical Times. (L 583)

EXPERIENCED ELECTRICAL ESTIMATOR required by large organisation, London district. Knowledge of cost analysis and price negotiation an advantage. Good personality necessary as outside contacts numerous. State age, experience and salary desired.—Box No. 9059, Electrical Times. (L 586)

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FIRST-CLASS PLANNING AND METHODS ENGINEER required to apply most modern assembly methods to manufacture of small electro-mechanical products, West London area.—Write, giving age, full details of experience and salary required, to Box No. 9053, Electrical Times. (L 582)

HANDLEY PAGE LTD. require an ELECTRICAL TECHNICIAN, preferably with H.N.C. (Elect.) and with a knowledge of electronics, for work in connection with the development of aircraft electrical circuits and installations.—Write, stating age, qualifications and details of experience, to Staff Officer, Handley Page Ltd., Cricklewood, London N.W.2. (L 566)

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JUNIOR TECHNICAL SALES ASSISTANT required by instrument manufacturers, West London area. Ordinary National Certificate minimum standard acceptable, and ability handle correspondence essential. Some knowledge of servo mechanisms; foreign languages an advantage.—Write, stating full particulars, salary required: Box No. 9047, Electrical Times. (L 575)

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MANAGER for Sales and Order Dept. of electric cable factory, S.W. London area; knowledge HOME AND EXPORT TRADE.—Reply, in confidence, stating age, experience and salary required, to Box No. 9043, Electrical Times. (L 563)

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(L 580p)

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Offers must be submitted in a plain sealed envelope endorsed "Offer for Charging Plant," and sent to the Borough Engineer and Surveyor, Town Hall, Mare Street, E.8, by September 1, 1951. The Council do not bind themselves to accept the highest or any offer.

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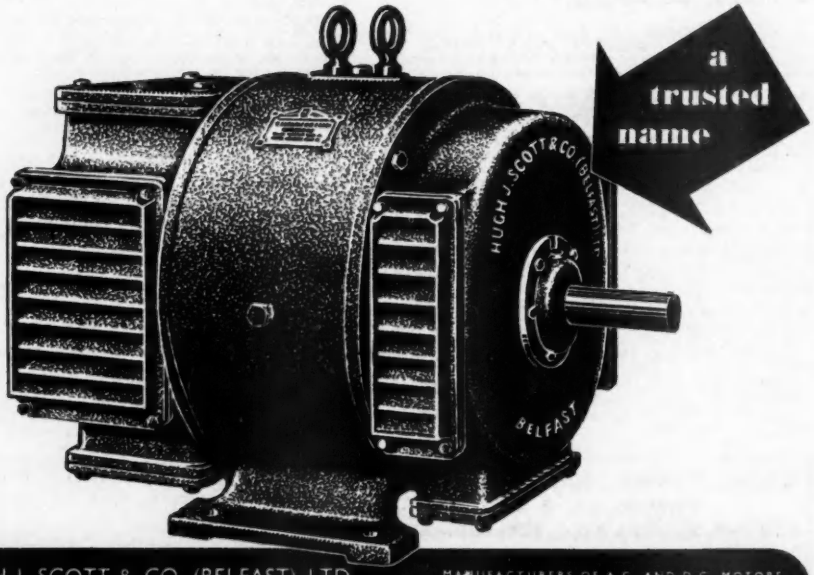
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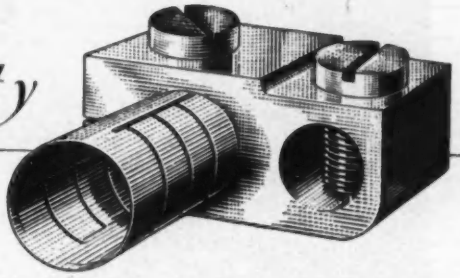

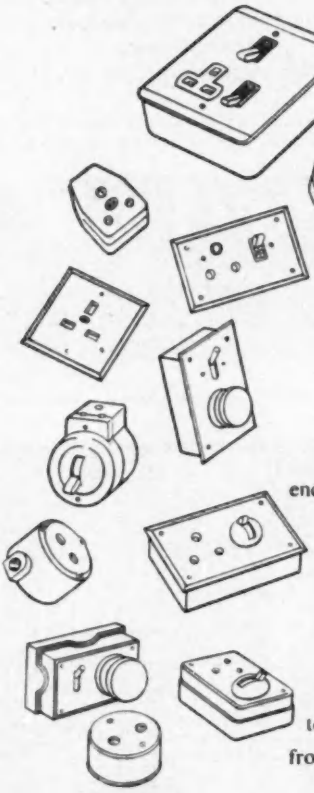

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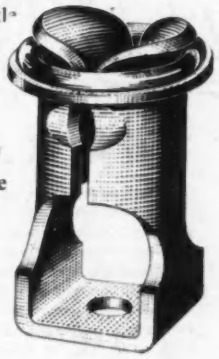

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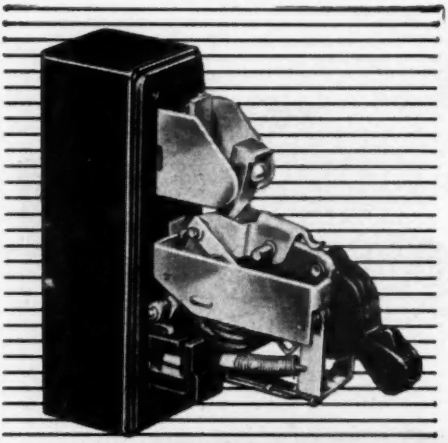

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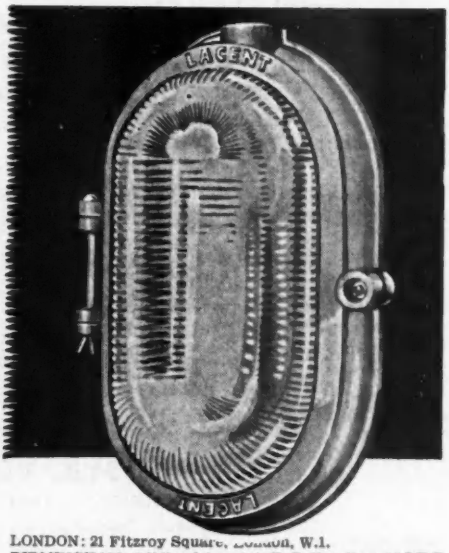

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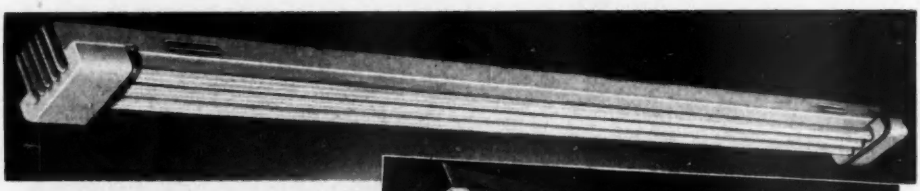

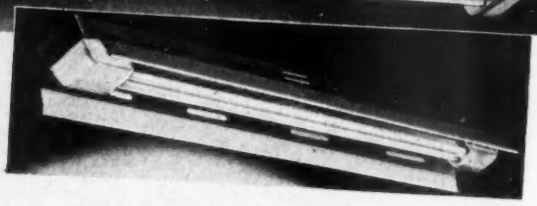

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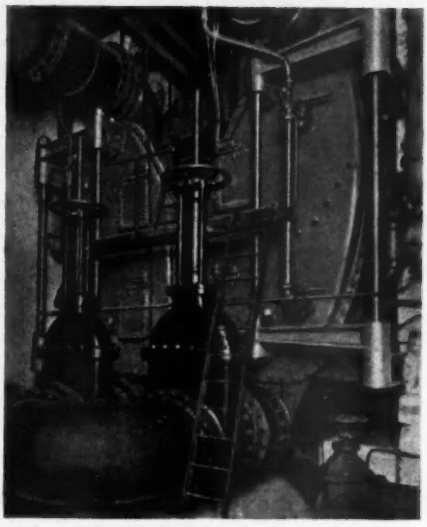

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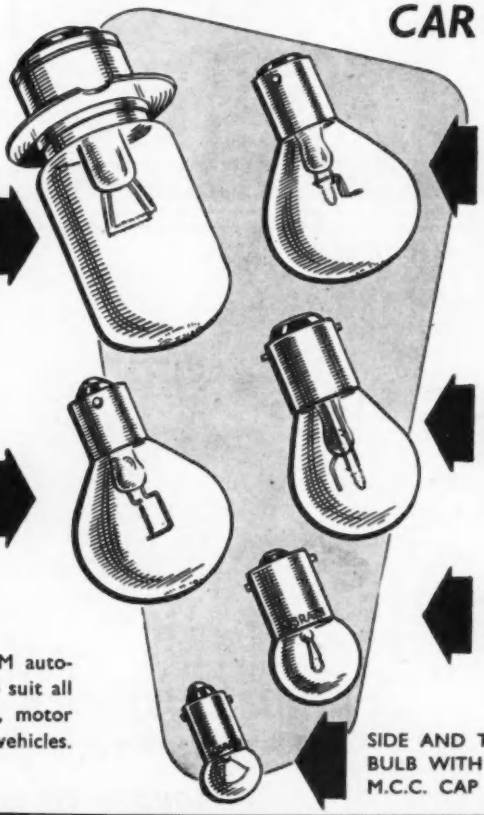

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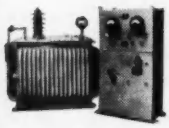

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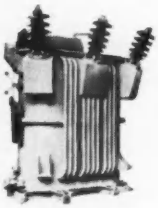

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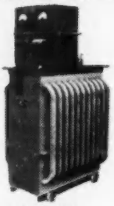

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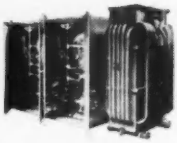

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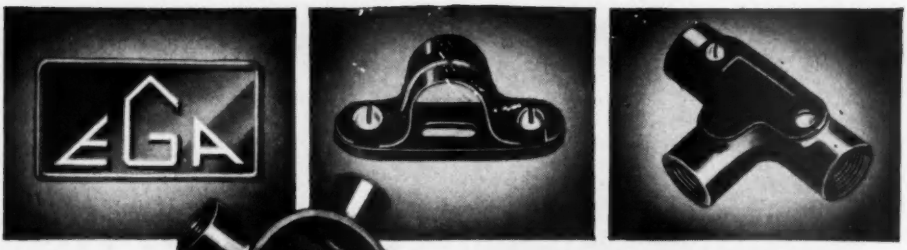
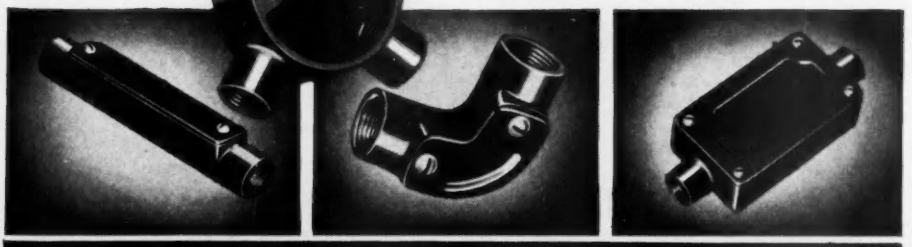


EGA CONDUIT FITTINGS



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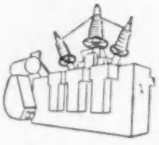

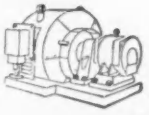

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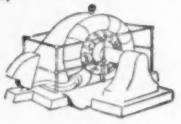

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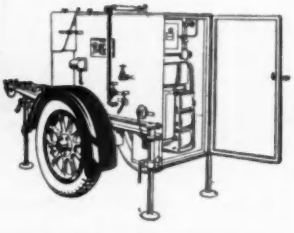

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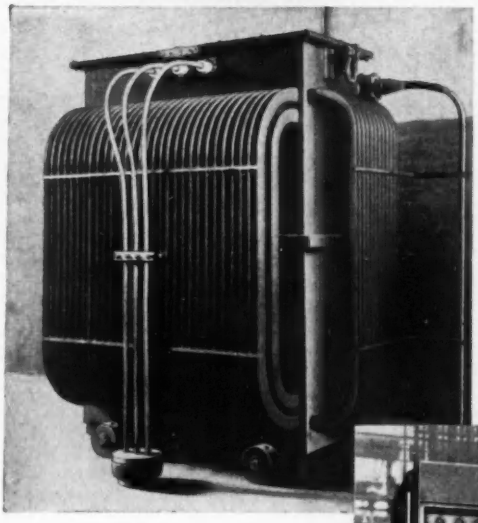

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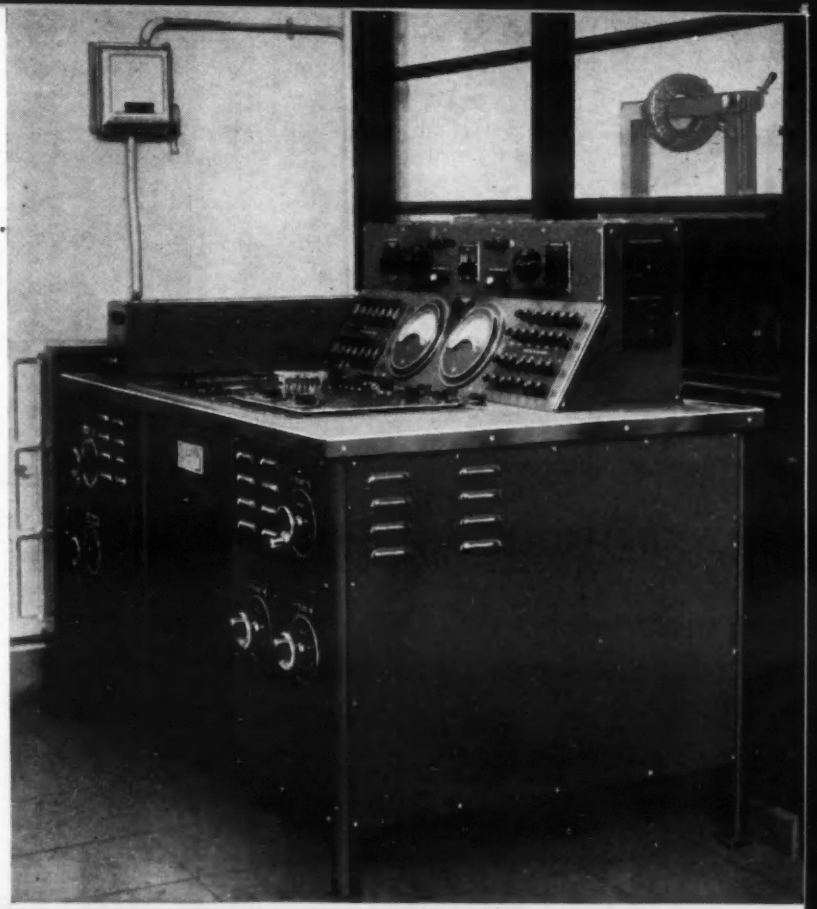

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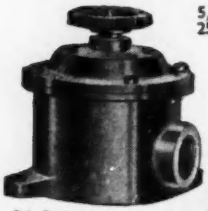
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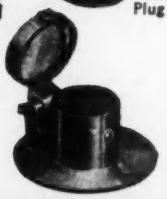
Push-on Flange Socket with Spring Cover

Cast Brass Terminal Socket and Cover

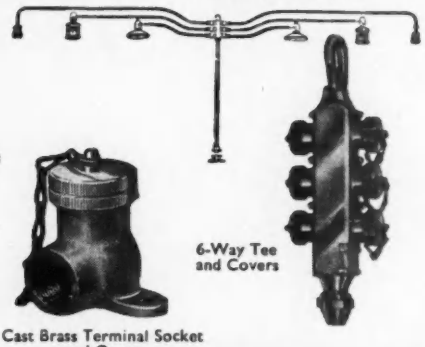
Diagram for Temporary Lighting with Fittings connected to 6-Way Tee
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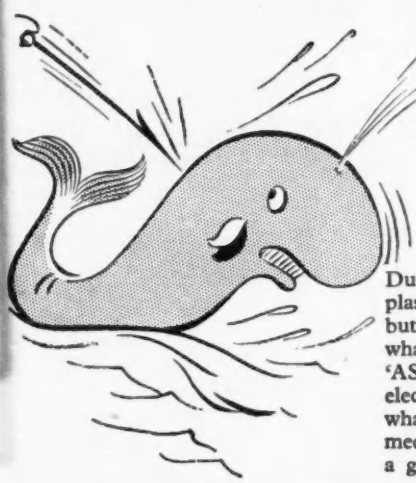

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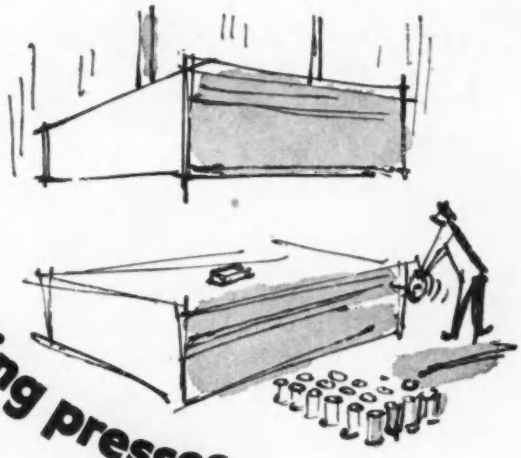

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THE FM METER

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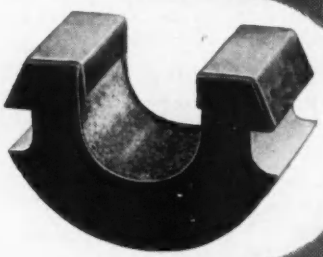

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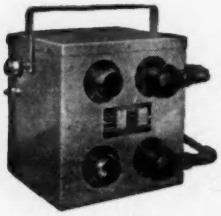

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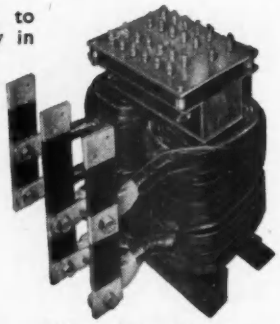

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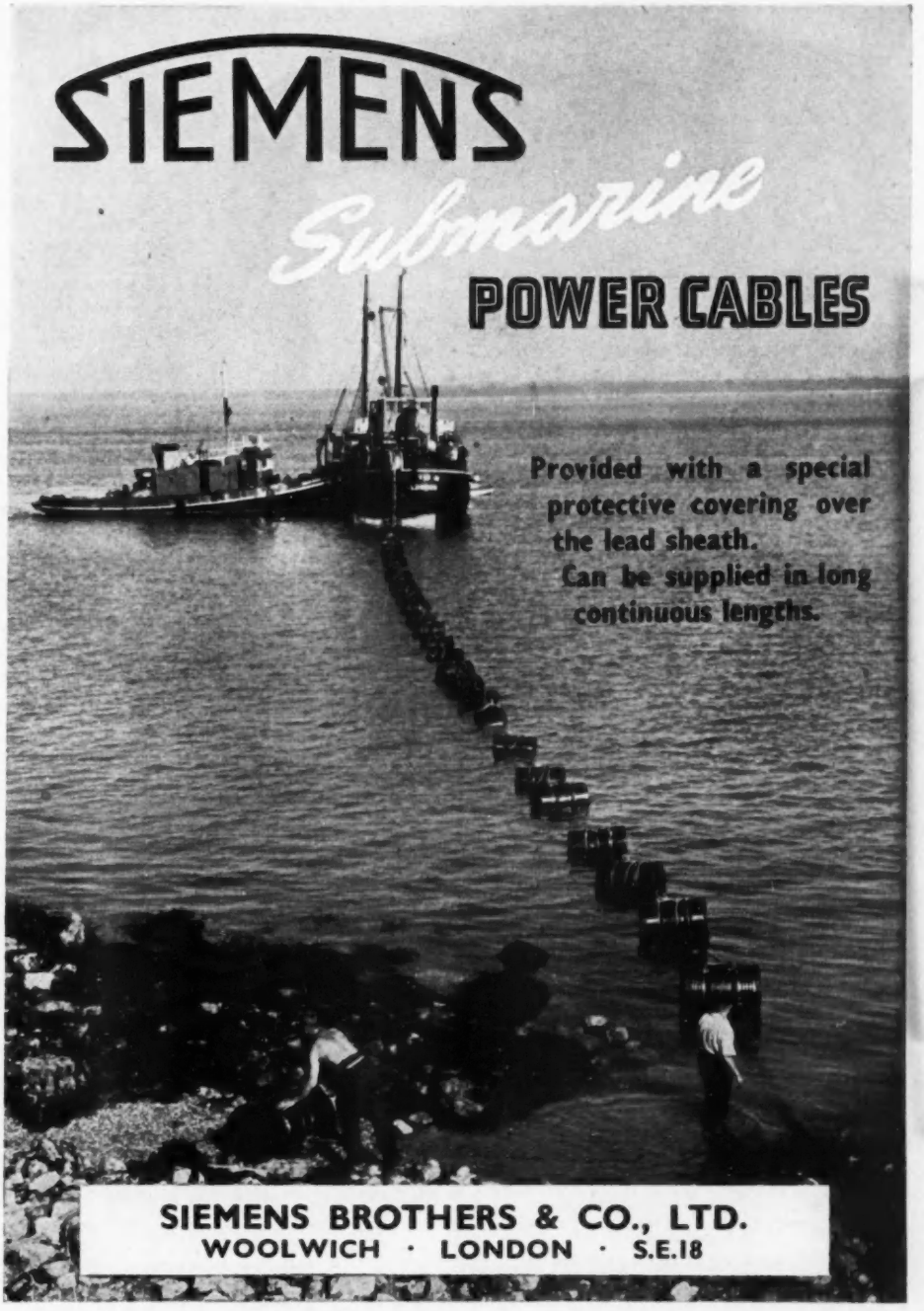
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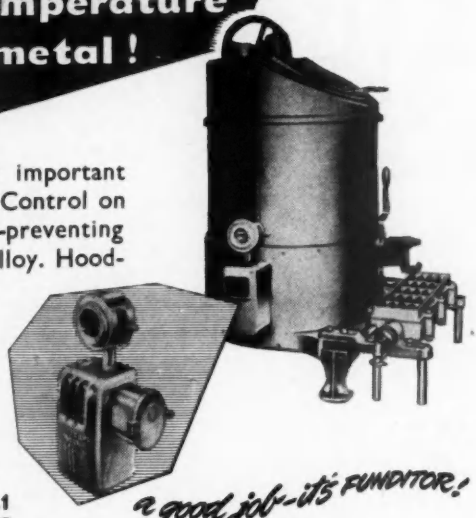

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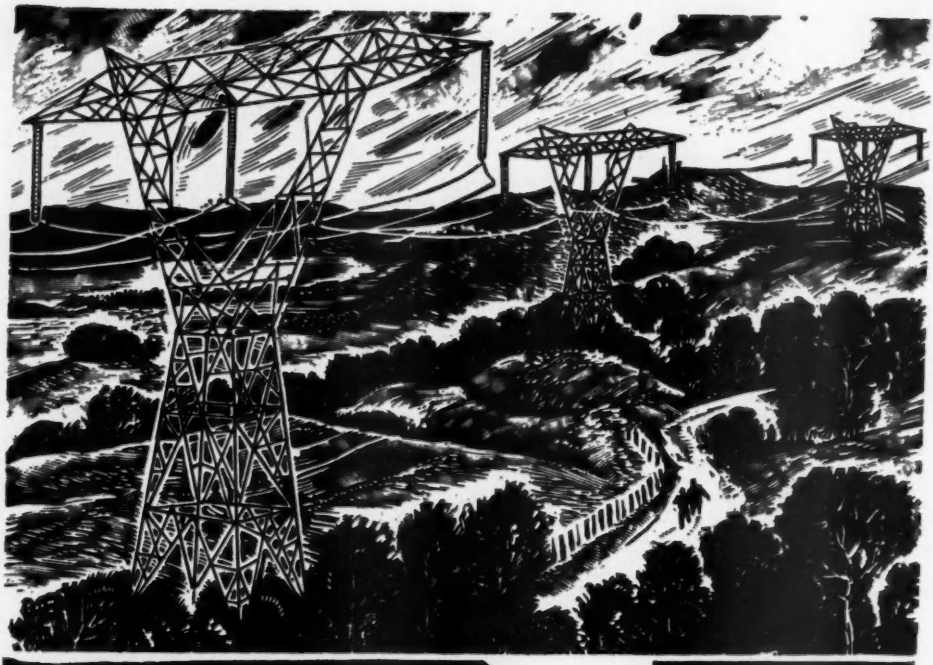
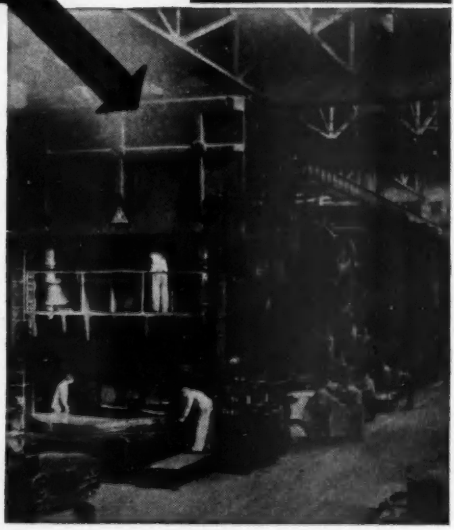


Power for the press shops

The Midlands, the Black Country, the workshops of the world . . . Call it what you will. The chances are that from there came the gears in your car, the lock on your door, the springs in your bed, the stove you cook on, the spoon you sup with . . . A thousand thousand things that you take for granted were confined to the unco rich before the Midlands boomed into mass production not so long ago . . And to keep the workshops of the world booming a network of electrical energy covers the country, putting the power into the punch of the presses. But power is not enough. At a multitude of points in the network Reyrolle Switchgear stands sentinel, breaking circuits there, controlling here . . making the whole vast business workable.



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SWITCHGEAR

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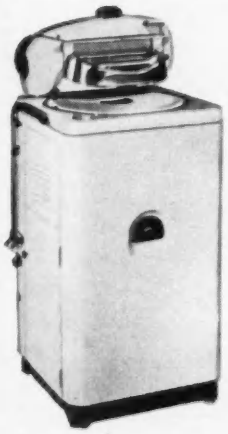
Printed in England for the Proprietors, THE ELECTRICAL TIMES, LTD., by SUN PRINTERS, LTD., London and Watford, Herts, and published at Sardinia House, Sardinia Street, London W.C.2. August 9, 1951

PACKING FOR THE JOURNEY

Here, in the Packing Department of the Parnall Factory at Yate, you see Parnall Electric Cookers being sturdily packed for their journeys all over the World. As much care is given to the design and construction of the packing case as is given to every stage of the making of the Parnall cooker—favourite with women the world over. Only available for export just now — but here's hoping it won't be long before there'll be plenty for the housewives of the homeland.



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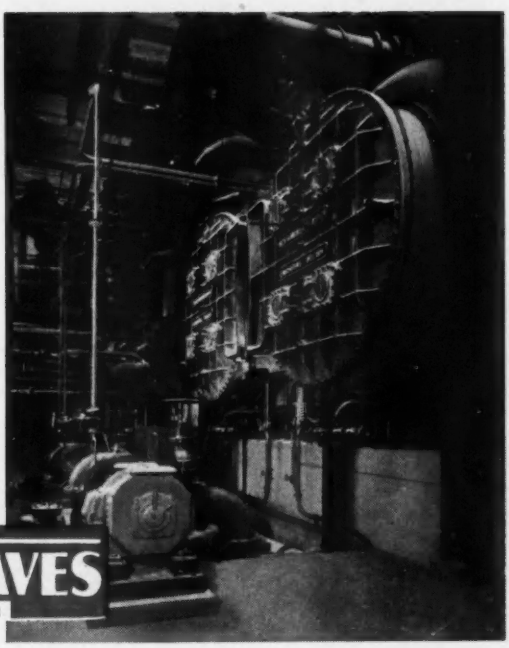

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